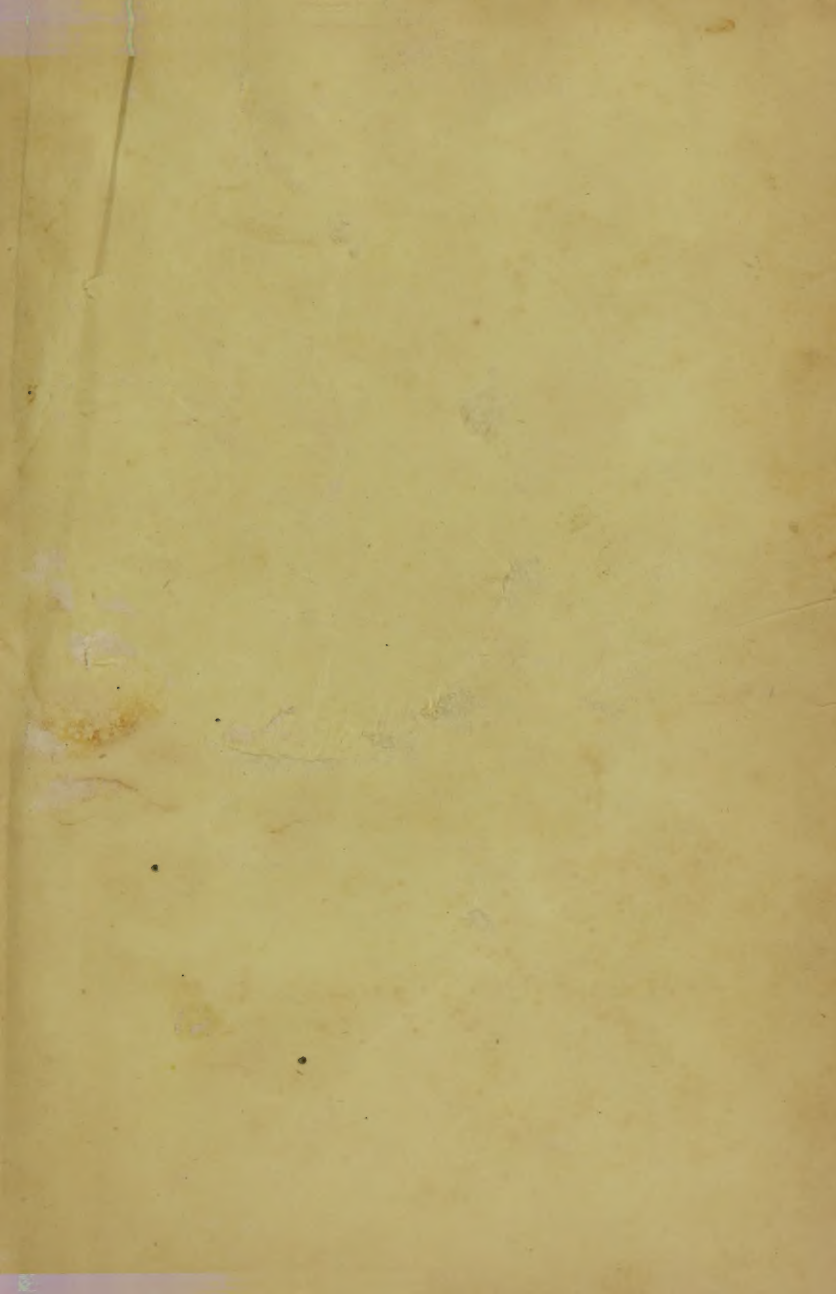
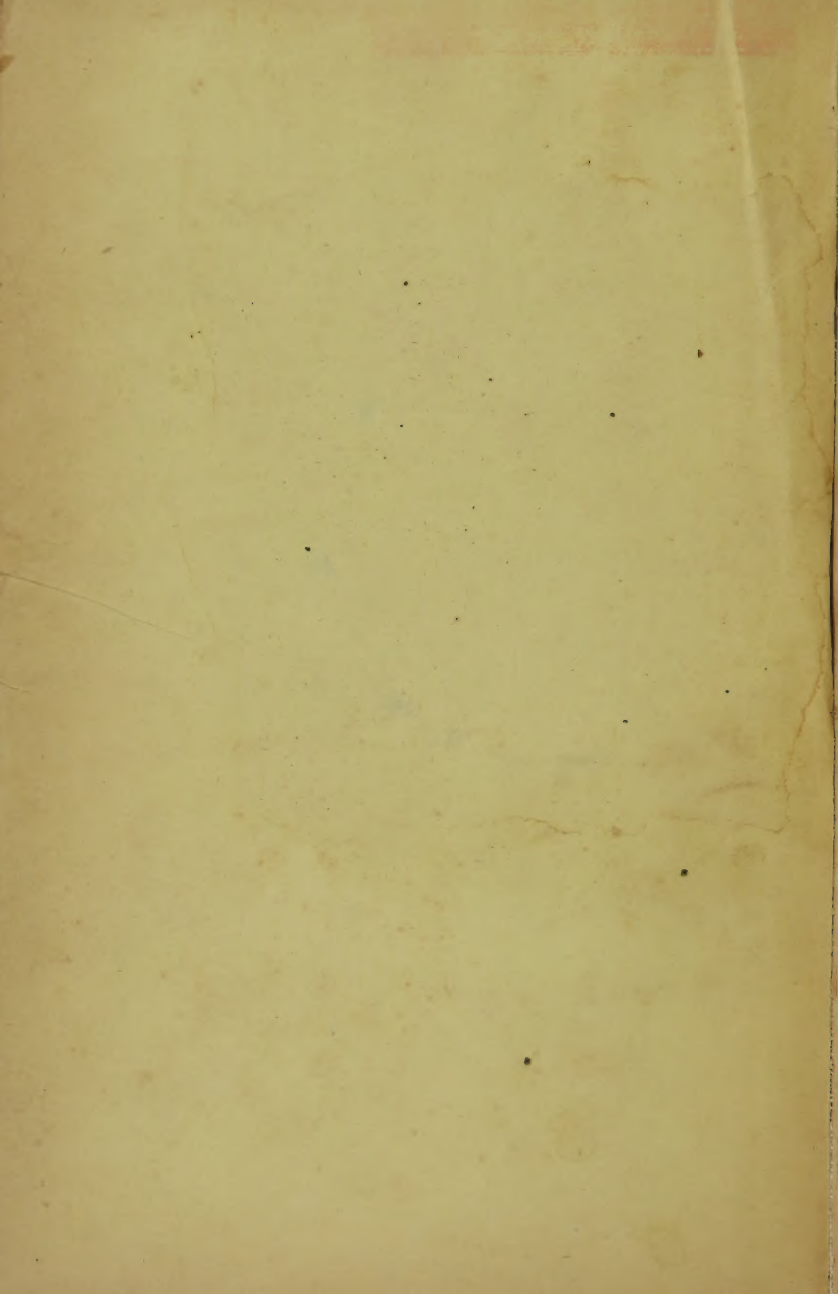
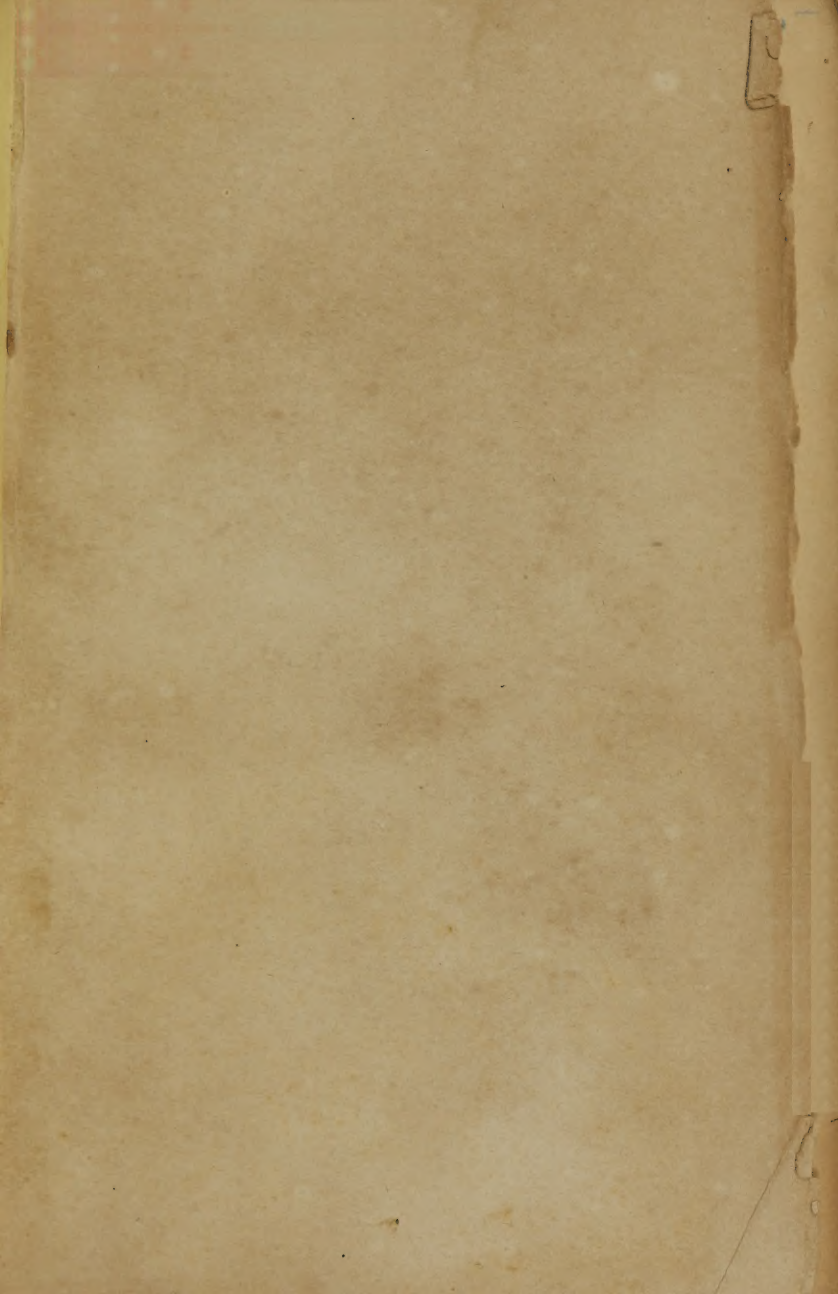


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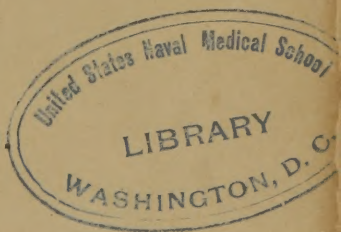
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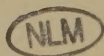
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## P R E F A C E .

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THE study of Natural History is commanding increased attention from year to year, in our own and foreign lands. The most illustrious names in science have won distinction in this comparatively modern field, and their contributions have served to excite others to the most enthusiastic and persevering labors to add to the stores of knowledge already acquired.

Notwithstanding the splendid results of the labors in these realms of inquiry which English and French Naturalists have made within the last twenty years, it was left for a German scholar to bring to the task the zeal, ability, and ingenuity necessary to condense into a moderate compass the information now available respecting the Animal, Vegetable, and Mineral Kingdoms. Such an undertaking was bold, and its success was doubtful. But the result has demonstrated the genius and skill of the author.

In presenting this great work in an English translation to the American public, the Publishers are confident that they are conferring a favor of no ordinary magnitude. In the original, the whole range of Natural History has been explored. The various kingdoms of Nature are traversed with the eye of an accurate observer, and from all the researches of naturalists who have gone before him, and the results of his own minute investigations, the author has pressed

into these luminous pages the most exhaustive view of the subject which has ever been attempted.

The number, the beauty, and the value of the illustrations, have very justly attracted the attention of students of Natural History, and commended this work as eminently worthy of being reproduced in this country.

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Such a study, reverently pursued, conducts the reader into the mysteries of the world around him, and leads him directly to the great First Cause, by whom all things exist.

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## REPTILES.

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# EXPLANATION OF PLATES.

## PLATE I.

- I.—The White or Caucasian Race.
- II.—The Black or Negro Race. Negro of the Loangores.
- III.—The American or Red Race. Carribean.
- IV.—Mulattoes.
- V.—Mestizos.

## PLATE II.

Fig. 1.—Skeleton. On the right with ligaments, on the left without.

- A* The Head.
- a* The Skull.
- b* The Eye-bones or Eye-sockets.
- B* The Neck.
- C* The Breast—Thorax.
- cc* Breast-bone—Sternum.
- dd* The seven True Ribs.
- ee* The five False Ribs.
- D* The Spinal Column.
- E* The Pelvis.
- F* The Upper Arm.
- f* The Collar Bone. Scapula.
- g* The Shoulder Blade. Clavicle.
- G* The Elbow Joint.
- H* Bone of the Fore Arm.
- o* The Spoke.
- p* The Elbow Joint.
- I* The Wrist Joint.
- h* The Wrist.
- i* The small bones of the hand. Carpal.
- k* The Fingers. Metacarpal.
- K* The Hip Joint.
- L* The Thigh.
- M* The Knee Joint.
- l* The Knee Pan.
- N* The Leg.
- m* The Shin Bone.
- n* The Calf of the Leg.
- O* Knuckles. Small Bones.
- P* Spring Joint. Tarsus Heel.
- q* Small Bones of Foot.
- r* Toes.

Fig. 2.—THE TONGUE. *a* Epiglottis—*b* The large Papillæ—*c* The mushroom Papillæ—*d* The small, thread-like Papillæ.

Fig. 3.—THE HAND. *a* Muscles—*b*

Sinews, Tendons—*c* Ligament of the Wrist.

## PLATE III.

Fig. 1.—*a a* Lips—*b* Upper Jaw—*c* Under Jaw—*d* The Hard Palate—*e* One half of the Tongue—*f* Pendulous Palate—*g* Pharynx—*h* The Throat. (Esophagus)—*i* Nostrils, walls of—*k* Nerves of Smelling—*l* Posterior opening of Nostril—*m* Head of Larynx, Windpipe.

Fig. 2.—*a* Epidermis—*b* Malpighian Net—*c* Corium—*d* Hair, with glands at roots—*e* Perspiratory Glands—*f* Their canals—*g* Cellular Membrane.

Fig. 3.—*a* The Stomach—*b* The Liver—*c* The Small Intestines—*d* The Large Intestines—*e* The Bladder.

Fig. 4.—*a* Bones of Lower Jaw—*b* The Milk Teeth—*c* The coming Permanent Teeth, before the first are removed—*d* The permanent Back Teeth.

## PLATE IV.

Fig. 1, 2, Mesentery Glands.

Fig. 3.—Salivary Glands.

Fig. 4.—Geometrical representation of the Heart and Circulatory Process.

Fig. 5.—*a* Vena Cava—*b* Right Auricle—*c* Right Ventricle—*d* Valve—*e* Pulmonary Artery—*f* Opening for the same—*g* Pulmonary Veins—*h* Left Auricle—*i* Left Ventricle, with Valve—*k* Opening opposite the Aorta—*l* Aorta, with branches.

Fig. 6.—*a* Head of the Windpipe—*b* Larynx—*c* The Branches of Larynx—*d* Left Auricle—*e* Left Ventricle—*f* Pulmonary Vein—*g* Pulmonary Artery—*h* Aorta, with branches—*i* Lungs—*k* Coronal Vein.

## PLATE V.

Fig. 1.—*a* The Eye-lid—*b* The Cornea—*c* The Sclerotica—*d* Choroid Coat—*e* Retina—*f* Optic Nerve—*g* Vessels of optic nerve, Centralis—*h* Front Eye-

chamber—*i* Iris—*k* Crystalline Lens, together with capsules—*l* Ciliary Process.

Fig. 2.—*a* Hammer—*b* The Anvil—*c* The Stirrup—*d* The Semicircular Canal—*e* The Cocklea—*f* Tympanum, second., little drum.

Fig. 3.—*a* Hammer—*b* Anvil—*c* Stirrup—*g* Anvil—*h* Stirrup—*i* Labyrinth.

Fig. 4.—*a* Exterior portion of the ear—*b* Outer Auditory Passage—*c* Membrane of Drum—*d* Cavity of Drum—*e* Eustachian Tube—*f* Hammer.

Fig. 5.—Hammer, natural size.

Fig. 6.—Anvil, natural size.

Fig. 7.—Stirrup Bone.

#### PLATE VI.

1 Great Monga—2 Great Gibbon—3 Jocko—4 Pavian—5 Uistiti—6 Sloth—7 Coaita—8 Mandrill—9 Bat.

#### PLATE VII.

1 Polar Bear—2 Pole-cat—3 Jackal—4 Brown Bear—5 Hyena—6 Glutton—7 Black Bear—8 Wolf.

#### PLATE VIII.

1 Lion—2 Tiger—3 Gepard—4 Wild Cat—5 Leopard—6 Ounce—7 Lynx.

#### PLATE IX.

1 Aenas—2 Squirrel—3 Flying Squirrel—4 Kangaroo—5 Jerboa—6 Banded Armadillo—7 Ant Bear—8 Ant Eater—9 The Sea Hog—10 Marmot—11 Hedge Hog.

#### PLATE X.

1 Camel—2 Chamois—3 Gazelle—4 Lama—5 Angora Goat—6 Zebra—7 Hungarian Zackel Sheep.

#### PLATE XI.

1 Reindeer—2 Elk—3 Giraffe—4 Stag—5 Musk Ox—6 Rabbit—7 Hare—8 Weasel—9 Shrew Mole—10 Wild Boar.

#### PLATE XII.

1 Rhinoceros—2 Hippopotamus—3

Buffalo—4 Elephant—5 Tapir—6 Indian Hog.

#### PLATE XIII.

1 Whale—2 Fishing Otter—3 Ornithorynchus—4 Norwhale, Sea Unicorn—5 Cachelot—6 Beaver—7 Seal—8 Walrus.

#### PLATE XIV.

1 White Headed Eagle—2 Lammergeier—3 Owl—4 Fishing Eagle—5 Forest Owl—6 Chichen Hawk—7 Sea Eagle—8 Secretary.

#### PLATE XV.

1 Bird of Paradise—2 Cherry Finch—3 Toucan—4 Humming Bird—5 Cross Bill—6 Wall Creeper—7 Parrot, formosus—8 Roller—9 Gray Parrot—10 Bunting—11 Fly-catcher—12 Rhinoceros Bird—13 Goat-sucker—14 Thistle Finch—15 Rock Swallow.

#### PLATE XVI.

1 The Ptarmigan—2 Cock of the Wood, Bearded Grouse—3 Ostrich—4 Golden Pheasant—5 Partridge—6 Spoon-bill—7 Flamingo—8 Bustard—9 Heron—10 Curlew.

#### PLATE XVII.

1 Oyster Catcher—2 Lapwing—3 Game-cock—4 Avocet—5 Pelican—6 Albatross—7 Sea Swallow—8 Stilt-bird, Grebe—9 Coot—10 Bittern.

#### PLATE XVIII.

1 Greek Tortoise—2 Geometrical Tortoise—3 Carette, Imbricated Turtle—4 European Fresh Water—5 Edible or Green Turtle—6 Kaiman—7 Iguana—8 Salamander.

#### PLATE XIX.

1 Rattlesnaké—2 Cobra di Capella—3 Boa Constrictor—4 Chameleon—5 Basilisk—6 Flying Dragon—7 Common Viper.



Plate 1,3,7,8,11,15-18 lacking



## INTRODUCTION.

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THE THREE KINGDOMS OF NATURE.—ANIMAL AND VEGETABLE  
PHYSIOLOGY.—GENERAL COMPOSITION OF ANIMAL BODIES,  
AND THE FUNCTIONS PERFORMED BY THEIR DIFFERENT  
ORGANS.

By the term *Nature* is meant the whole extent of creation, and *Natural History*, therefore, includes within its compass all that relates to the earth, describing the minerals found in its depths, the plants adorning its surface, and the living creatures which are found everywhere throughout its wide domain, from the highest rank to the lowest. In more closely contemplating those natural objects by which we are surrounded, great and striking differences are found in their structure and qualities; therefore these natural bodies have been divided or classed into three parts or groups, which are termed the three *kingdoms* of nature.

The first division, composed of inorganic matter, is called the *mineral kingdom*; the second, comprehending plants, is termed the *vegetable kingdom*; and the third is known by the name of the *animal kingdom*, because within its compass all living beings, from man to the zoophyte, are included.

The mineral kingdom is distinguished from the two others by being made up of inorganic matter, or such ob-

jects as are not possessed of life, whilst plants and animals, endowed with the vital principle, and fitted with organs suitable for carrying on the functions of existence, are called organized. Let us, then, observe more closely the difference between a living body and an inert and lifeless substance.

A stone, for instance a flint or pebble, does not materially change its form, although it may lie in the same spot for years, and be subject to the action of wind or waves; its shape, weight, and color remain the same, and being without the power of motion, it gives no sign of life. When broken, no curious internal structure is disclosed, but inside or outside, the substance appears exactly alike. A closer observation will, nevertheless, show that stones are also capable of undergoing certain kinds of change. By the constant and mechanical action of water, the sharp edges of rocks are worn away until they present a smooth and round surface. This is often very plainly observed in artificial waterfalls, where the harsh angles of hewn stone have in time become even and polished through the continued washing. Nor does the law of diminution obtain in the mineral kingdom only; new bodies are frequently produced, as may be observed in the stalactites that hang from the roofs of caves or other vaults where water oozes through the crevices of the rocky wall, the lime or chalk held in solution by the water dropping on the stones below, either taking the form of crystals or depending like icicles, which they resemble, really become stones. Such an increase of size is, however, materially different from the growth of animals and vegetables, which are organic matter; that of the one being entirely mechanical and proceeding from a principle operating from without; the

other depending on a principle existing within. This mechanical growth of inorganic matter can be exemplified by trying the following simple experiment: Put as much common salt into a glass of water as will dissolve in it, leaving the water perfectly clear; place this solution in the sun, and gradually small crystals will begin to form; these will increase as the water evaporates, still growing larger as the particles of salt dissolved adhere to each other.

In surveying the nature of organic life and growth, as exhibited in plants, we are struck with the difference between the living and the inert products of nature. Plants, indeed, move as little from their places as stones; nevertheless we can discover at the first glance their different proportions, such as roots, trunks, leaves, and flowers. Yet, notwithstanding that the life of many plants continues for a long time, they do not, like stones and rocks, remain unchanged in form, color, and size, but the manifest difference between the two is constantly shown in the renewing and spontaneous changes the former undergo. First the buds come forth, then, falling off, they give place to the leaves, the blossom appears next, and lastly the fruit—forming constantly, as it were, a new creation.

The growth of plants, however, does not in the least resemble the process by which stalactites are enlarged—namely by the juxtaposition of similar particles and consequent adhesion. The plants draw in, through their fine roots, a supply of such nutritive matter from the earth as is necessary for their existence and growth; minerals, on the contrary, have no such dependence; the matter of which they consist is always the same—containing within themselves everything essential to their existence, they have, of course, no necessity for nutri-

tion or growth. Hence there is an obvious and complete distinction between organic and inorganic bodies, in the fact that the former receive the nutrition essential to their existence and growth into the system, and this food, operated upon by the organs of the vegetable or animal, becomes assimilated to it, so as to make a component part, while the latter remain resting in their original strata unchanged.

Notwithstanding the necessity of, and capacity for receiving a regular supply of a certain quantity of aliment, adapted in kind to the nature of the plant or animal creature, exists throughout the whole animal or vegetable kingdoms, there is yet a striking difference between them, since animals are capable of voluntary action, and move about from place to place, whereas plants, deriving their nourishment from the earth, in which they are firmly rooted, never change their position.

The oyster—now admitted to be of animal nature—shut up in its shell, remains fixed to the rock on which it was first produced, but this immobility is very different from the steady position of the plant, and has no necessary connection with the principle of nourishment, as derived by the latter from the earth. But, although plants are incapable of locomotion, a closer inspection will show us that they possess a faculty of vegetable motion, as the most careless observer may have remarked in such trees and plants as live in the open air, which always turn their leaves and flowers toward the clearest light. This power of motion is, however, more plainly exhibited by plants cultivated in pots and kept in the house, which invariably incline towards the window, so as better to enjoy the light. Nurserymen take advantage of this vegetable motion; and in order to raise



trees of tall and straight growth, they plant the seeds very close together, so that the young plants, being shaded by each other from below, the strongest are driven upward in more vigorous and rapid growth than others, and exalt their leafy crowns above, as if striving to share the light so necessary to their existence. Animals are distinguished from plants, not only because their movements are not dependent on the stimulus of light and heat, nor do they absorb their nutrition from the earth, but also because they are incapable of being, like them, nourished by the common elements of nature. The food of animals consists either of animal or vegetable substances, which are operated upon by organs, differently arranged in different species. This food, received into the body, is there digested by an internal process, the principal agent of which is the stomach. Within the cavity of the body are numerous fine organs which perform all the functions necessary to animal existence, and, like the roots of plants, are constantly absorbing and assimilating the materials essential for the maintenance of the structure. Hence Linnæus, the great naturalist, used to say that, in this respect, animals were plants which carried their roots internally.

A greater difference, however, than in the manner of receiving nutrition, exists between the subjects of the two living kingdoms; those of the animal, in addition to their superior internal structure, are also furnished with organs which, while bestowing upon their possessors powers of sensation, perception, and volition, also render them capable of the emotions requisite for enjoyment, aggression, or defense. They are attracted by that which is pleasant, frightened or repelled by what is terrible and repulsive, or provoked to anger by opposition—

thus showing a capacity for a sudden change of emotions, which also distinguishes them from the subjects of the vegetable kingdom, even such as exhibit the faculty of sensation. When the leaves of the sensitive plant are touched they shrink, and, together with the branch, bend down toward the earth; but after a certain time they rise again, and gradually recover their natural position. This motion is, however, entirely dependent on the plant itself—no outward influence, such as light or heat has any agency in promoting its recovery.\* An animal, however, being excited by any unpleasant emotion, such as anger or fear, prepares for defense, retreats into its shell, or retires from the presence of aggression, but as soon as the offense or danger is past, all is at once restored to original calmness. This difference between the sensation of the animal and the plant proves that the former acts from the operation of an independent will, yielding to a pleasant impulse as readily as to an unpleasant one, which is not the case in vegetable emotion.

Plants as well as animals, possess two distinct orders of structure, one of which establishes the framework and the other forms an exterior covering and protection for those tender and delicate organs which carry on the more important operations of life. Both have a skeleton—in the

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\* There are many instances of plants possessing the faculty of moving as if with some definite purpose. The moving plant (*Hedysarum gyrans*) furnishes the most astonishing examples of vegetable motion. (See Botany.) Venus' fly trap (*Diaonea muscipula*) is another not less striking instance of rapid vegetable motion, and the common barberry, if the inside of one of the filaments of its stamens—when the flower is fully expanded—be touched with a pin or straw, it will throw its anther forward with some force against the stigma.—*Trans*

vegetable it gives form and stability, and to the animal, besides the office already mentioned, it also affords means of activity and locomotion. Both are furnished with vessels and tubes which carry on the circulating medium; but the structure of plants, though ingenious and beautiful, is much more simple than the complicated organism of animals.\*

Vegetables, as before stated, are limited to the processes of nutrition and growth, and, therefore, fewer organs are requisite to carry on the course of existence in them.† Animals, having sensation, perception, and volition, require, besides the framework which protects the viscera, and renders them capable of exerting muscular power, another structure, namely—the nervous system. By means of this perfect and mysterious machinery, the mind acts upon the body, receiving from, or making impressions on the world without; and all knowledge of everything by which the creature is surrounded, is acquired through the operations of its wonderful agency. Such animals as have a more perfect nervous develop-

\* The principal seat of the growth and nutrition of plants is in the bark and alburnum (sap wood), and all the new matter annually added is deposited on the outside of the latter and inside of the former, so that the growth of a year is only subservient to the circulation of the next, and is ever afterwards of use merely in giving strength and stability to the trunk, in order to support the increasing size and weight of the branches and leaves.—SMELLIE.—*Trans.*

† It may here be observed that in vegetables there is none of that absorption of different parts, which takes place in animals. The matter of which they are composed, being once deposited, is never taken up again, while in animals there is a constant process going on, by which the old matter is taken away and new deposited, and the organs thus renewed. Perhaps this end is intended to be answered in vegetables by the annual renewing of their circulating system.—NAT. PHIL.—*Tr.*

ment, are always possessed of greater intelligence ; having a capacity to comprehend and execute in greater or lesser degree, according as they rank high or low in the graduating scale of being. A simple illustration will serve to exemplify our meaning. A dog, for instance, knows his master ; he hears, smells, feels—in short, his senses are perfect—he has vivacity, strength, and courage, expresses approbation or dislike, and in every way shows that he is, to a certain degree, capable of thought, and possesses an inner life. A snail, on the other hand, also feels, smells, and tastes, but can not see, for the eyes are on the trunk or horns, and seem to serve rather for feeling than seeing ; without the faculty of hearing, and apparently without sensation, it yet possesses a kind of mechanical life, which renders it susceptible to the transitions of heat and cold.

This distinction in nervous efficiency, conspicuously marked in the different varieties of animals, separates them almost as widely from each other, as it does the animal from the vegetable ; and in order to treat of their various characteristics, so as to be clearly understood, the different races of the animal kingdom have been grouped into assemblages, and these again divided and subdivided into orders, genera, species, etc., and is called the Classification of Animals. These distinctions grow out of the different structures, functions, and power of their organs, all of which vary in number and complexity, as they rank higher or lower in the grand scale of creation.

Respiration, or the reception of air into the body, is absolutely necessary for the existence of every vegetable or animal, for without the presence of this common elastic fluid, neither plant nor creature can live. In order

better to understand the manner in which it contributes to the support of living things, let us use a simple illustration. As a lamp can not burn when its oil is withdrawn, so do plants and animals die if deprived of air, which is as necessary to the support of life, as oil is to feed the lamp, and prevent it from going out. No animal can exist without this indispensable fluid, nevertheless different classes of animals differ very much as to the manner in which the function of respiration is performed. But Nature, kindly adapting her gifts to the need of her children, has provided organs of singular and varied mechanism, but altogether suitable in structure, for the function of respiration or reception of the kind of air necessary for the creature's life. That which animals and birds breathe is the aerial or pure atmospheric air,\* while that respired by fishes, amphibia, and

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\* Although the air as we breathe it seems to be a simple and homogeneous fluid, yet it is in fact composed of two distinct constituents or elementary parts, upon the mixture of which its adaptation to the preservation of life depends; containing, besides, some other ingredients of minor importance. These main elements are two permanently elastic fluids or gases called oxygen and nitrogen or azote. Oxygen, which enters into the composition of the air, forms but about one-fifth (twenty-one parts in the hundred), yet it is its most important part. It is to the oxygen that the air owes its property of supporting life, and of sustaining the burning of combustible bodies when inflamed. Azote or nitrogen, which enters into composition of the air in the proportion of seventy-nine parts in a hundred, is unfit for respiration and incapable of combustion. It seems only to dilute the oxygen, and thus mitigate the otherwise too irritating action of this gas. By being breathed upon, the air changes its nature; the oxygen gradually disappears, and is replaced by another fluid called *carbonic acid* gas. Carbonic acid gas is composed of oxygen combined with carbon, derived from the blood; instead of being fit to support life, it acts as a poison to animals that breathe it for a short time, and causes death.—PHIL. NAT. SCIENCE.—Tr.

other creatures which live in the water, is aquatic. That fishes, whether they inhabit the pure spring, river, pool, or sea, must have a free communication with the external air, is proved by the following experiment. If oil is poured upon water, contained in a glass globe, where fishes are kept, they will die as soon as they have exhausted the air contained in the water, because a further passage of the atmospheric fluid is excluded by the covering of oil.\* So also do they die in warm water; and because they do so, cooks have been falsely accused of cruelty when they throw crabs into water and suffer it to come to boiling heat—for, as the latter increases, the air flies off in vapor, and the poor creatures are at once suffocated.

In surveying the series of animals, from the lowest worm up to the lordly man, we will find all provided

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\* Carbonic acid gas, which extinguishes bodies in combustion in the same way as azote, is formed by the combustion of charcoal; also during the fermentation of wine and of beer, which makes it sparkling and frothy. It is upon the action of this gas on the animal economy that the *asphyxia* (suspended animation), produced by the vapor of charcoal, depends, as well as the greater number of accidents of the same sort which occur in mines, caves, wells, and vats, wherein wine or beer is fermenting. In a grotto called Grotto del Cane, this deleterious gas is continually disengaging, and has this singular property: If a man enters this cavern, he experiences no inconvenience in his respiration, but a dog following him, very soon after falls down in a state of asphyxia, and would soon die if he were not speedily removed into the pure air. This arises from the fact that carbonic acid gas, being much heavier than the air, sinks down and forms upon the bottom of the cave a bed or stratum of about two feet thick. Now, a dog that enters the grotto is necessarily plunged over his head into this *mephitic* (offensive) vapor, and consequently becomes asphyxiate, while a man, who is very much taller, has only the lower part of his body exposed to the action of the carbonic acid, and breathes freely the air which floats above.—ELEMENTS OF PHYSIOLOGY.—*Tr.*



with an apparatus suitable to carry on the great business of life. First, there is the skeleton, inclosing the circulatory system, which is carried on by means of vessels, serving to convey nutrition to every part, as is seen in plants; further there is an alimentary and respiratory system,\* of which latter the leaves are the agents of transmission, and in animals, whose structure is higher and more complex than that of vegetables, it is carried on by lungs or gills. Besides this, animals possess a muscular system, which, inclosing the skeleton, gives capacity for movement, and another which is the apparatus of the sensations, and is called the nervous system, by which the living creature, from the least to the greatest, is endowed with intelligence and the power of vigorous action—from simple perception and consciousness to the highest reasoning and loftiest range of thought.

But, as everything belonging to life is fashioned from living substances which are perishable and always terminate in death, so the materials which entered into their composition, when deprived of the vital principle, separate, and return to the original elements possessed before becoming parts of a living system and—dust returning to dust, are resolved once more into inorganic nature.

In the lower classes of animals this framework is either in the form of a shell or a horny substance, resembling

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\* In all the mammalia, in birds and reptiles, respiration takes place in lungs, and very nearly in the same manner as in man. In the greater number of aquatic animals, such as fishes, lobsters, oysters, etc., it is altogether different; respiration takes place through the medium of a sort of membranous fringe called *branchiæ* (gills); in insects through particular canals called *tracheæ*; and, finally, there are some animals, which have neither lungs, gills, or tracheæ (air canals), but respire through the surface of the skin. The common earth-worm is an example of this.—*Tr.*

a flexible coat of mail, that form a covering for the internal organs, which, soft and yielding, are used for muscular action, while others, having no protection for the brain and nervous system from any bony covering, are classed still lower and lower as they are found wanting in regularity or symmetry of form. The first order of this latter class are the mollusca (from the Latin *mollis*, soft, a class of marine animals without articulated limbs); the second, insects; the third, vermes, or worms; and the fourth, radiata, so called on account of their configuration, from the Latin *radius*, a spoke, which last form the lowest class of the animal kingdom. We have in all eight classes, which we propose to study. It is true that some modern naturalists have subdivided the lower orders of animals into many more classes than we have named, but as this would only render our task more complicated without any corresponding benefit, we will confine our investigation to the system of arrangement existing between the four principal classes. The foundation of the structure in the first class is the vertebral column; it is composed of a number of bones called vertebræ, and is, as it were, the main pillar or common support of all the rest of the skeleton, and inclosing the most important organs of the nervous system. Hence, the animals possessed of it are called *vertebral* animals, as this forms the most striking characteristic common to them all. In animals of the second division, there is no skeleton, and of course no vertebral column; therefore they have been denominated *invertebral* animals, and consequently possessing less intelligence, take a lower place in the scale of being.

Let us now begin our study of the first class, which is called *mammalia* or mammiferous animals.

## CLASS I.

### M A M M A L I A .

DIVISION INTO ORDERS AND FAMILIES.—DIFFERENCE OF  
STRUCTURE.

MAMMALIA, or vertebrated animals, are, of all animated beings, those whose faculties are most various and most perfect, whose organs are most numerous and complicated. The blood is warm and of a red color; they breathe through an apparatus situated in an internal cavity of the body, called lungs; move by means of four extremities, and, in most cases, are covered with hair. The conformation of the extremities varies; in some they are fitted for flying, in others they are so short and imperfect that they serve only for swimming, being of little use in walking. The under jaw only is moved in the process of mastication, the eyes are protected by two lids, which are fringed with hair (some, it is said, have a third eyelid), the cavity of the ear is provided with an external covering, the tongue is generally thick and fleshy. The females of this class bring forth their young alive, and, as their name implies, nourish their infant progeny from the milk secreted by the organs called *mammæ* or breasts.

Cuvier divides this class, *mammalia*, into nine orders, namely:

FIRST ORDER: BIMANA—Two hands and two feet; *man*, the only species of this order.

SECOND ORDER: QUADRUMANA—Animals having four hands instead of feet; the *ape*.

THIRD ORDER: CARNIVORA—Animals with sharp, cutting teeth, living principally on flesh. This order is divided into three great families, to wit:

- I. *Cheiroptera*—*Bats*—Having wings, formed by a membrane which is sustained by excessively long fingers singularly developed.
- II. *Insectivora*—To this family belong the feeblers animals of Carnivora, such as the *hedgehog*, *shrewmouse*, *mole*, etc.
- III. *Carnivora*—Animals belonging to this family are divided into three tribes:
  1. *Plantigrada*—Having flat soles on their feet, resembling those of the human species; the *bear*, *raccoon*, *badger*, and *glutton* are the most remarkable genera of this tribe.
  2. *Digitigrata*—More exclusively beasts of prey than the *Plantigrada*; the principal of these are the *dog*, *weasel*, *polecat*, *hyena*, and *cat*.
  3. *Amphibia*—*Phoca*—Only two families compose this order; the *seal* and the *morse* or *walrus*. The seal tribe is divided into several genera, often designated under the names of *sea-dogs*, *sea-bears*, etc.

FOURTH ORDER: MARSUPIALIA, or *pouched animals*—Which have the peculiar organization of a pouch which serves to lodge their young while they are being suckled. The *kangaroo* and *opossum* represent this order.

FIFTH ORDER: RODENTIA or GNAWERS—So called from their chisel-shaped teeth, which consist of incisors and molars. This order includes *squirrels*, *rats*, the *beaver*, and the *hare*.

SIXTH ORDER: EDENTATA or TOOTHLESS—Are either without teeth or have them very imperfectly developed. Under this head is classed the *sloth*, *armadillo*, *anteater*, and the *ornithorynchus*.

SEVENTH ORDER: PACHYDERMATA or THICK-SKINNED—Comprises animals of very great size; the extremity of the foot is enveloped in a very large nail, which constitutes a hoof. They have a hard, thick hide, which, in some, is covered with coarse, bristly hair. They are divided into three families—namely:

- I. *Proboscidea*—The *elephant*, with trunk and tusks—one genus only of this order.
- II. *The true Pachydermata*—The *hippopotamus*, *rhinoceros*, and *hog* are distinguished from the first by having no trunk.
- III. *Solipedes*—Animals with a single hoof; the *horse*. One-hoofed.

EIGHTH ORDER: RUMINANTIA—Animals which ruminate or chew the cud; these are distinguished by first swallowing their food and chewing it afterwards. Two families belong to this class.

- I. *Without Horns*—As the *camel* and *llama*.
  - II. *With Horns*—*deer*, *giraffes*, *chamois*, *sheep*, *goats*, and the *ox*.
- NINTH ORDER: CETACEA—Which is divided into two families.

- I. *Herbivorous Cetacea*—As the *sea-cow* and *dugong*.
- II. *Carnivorous Cetacea*—As the *whale*, *porpoise*, and *dolphin*.

The difference in the orders of mammalia is easily discovered by the conformation of their teeth, which are formed to suit the character of their food. There are in the whole three forms of teeth; first, the incisors or cutting teeth—these are chisel-shaped and serve to seize their food; second, the canine teeth—these are wedge-shaped, pointed and sharp, and are necessary to seize and divide their living prey; the third are the molars, which perform the office of mastication, and grind the food so as to be proper for the nutriment of the body. Very great differences exist among the mammalia as respects their teeth. These organs being formed always in relation to the kind of food required by the animal, some, therefore, have more than others, and have them also more or less perfectly developed. The rodentia have no canine teeth, but the incisors are remarkable for their strength and arched form; in the horse the teeth all partake of the molar shape, while, on the other hand, the teeth of carnivorous animals are principally of the canine form. The two classes belonging to the order of

Cetacea, have teeth mostly of the same kind, differing only in the conformation. The food of some, being herbaceous, they possess molar teeth with flat crowns, whilst others—the blowers—such as the dolphin and porpoise, are distinguished from the first-named family by the garniture of the mouth, the teeth, when they do exist, being pointed. The common distinctive character of the Edentata or toothless animals, is, as with the genera above named, the absence of the incisor teeth in the upper jaw. The sloth possesses teeth altogether of the molar form; in others of the same class they are entirely wanting. The incisors placed in front of the upper jaw serve the animal to seize and hold his prey; the canine teeth enable him to divide it into morsels, and, at the same time, serve him as weapons of defense; to these follow the molars or grinders, which are placed in the anterior portion of the jaw, and in the herbivorous classes, are compactly arranged. Many animals have a large vacant space between the canine teeth and the molars, as the horse and animals of the rodentia order; in others are found imperfect or tuberculous teeth, which do not operate on each other, as in the dog. As it is important to know how many teeth characterize the different genera of animals, for the sake of brevity, we will place the distinguishing marks in the following order: First, the incisors, above and below; next, the canine; then the molars or grinders. For instance, when we say of the genus homo,  $\frac{4}{4}, \frac{2}{2}, \frac{16}{16}$ , we mean that man has four incisors, two canine teeth, and ten molars, both above and below. With the teeth and their uses, the movements of the jaws are closely connected. In carnivorous animals, which seize their prey living, and are obliged to hold it fast, the jaws move as on a hinge



from above to below ; but in the ruminant family, which swallow their food first, and afterwards chew it, the movement is principally sidewise ; and the rodentia or gnawers, such as rats, squirrels, etc., move the jaw from the front backward.

In a certain connection with the teeth are the extremities, since they, too, are of great importance in the classification of the peculiar genera. Four very distinct varieties mark the gradations in the chain of being, viz., the different conformation of those extremities, as hands, paws, hoofs, or fins. Those having the hand conformation are distinguished as *quadrumana*—such as the ape, kangaroo, and opossum, as well as those of the rodentia order ; these members, however, dexterously used, serve more for feet than hands, and differ from the extremities in the *bimana*, although, in the main, resembling them. Monkeys and others that climb, generally have their extremities fitted for the performance of prehension and touch, and, in all, are adapted for the particular kind of life the animal is to lead, forming the wings of the bat for flying, as well as fitting it for locomotion and prehension, whilst in the sloth they operate as a vice in retaining the prey, which, if once escaped, the sluggish creature could not overtake. The next in order are the *carnivora*, which have the paws armed with hooked nails, suitable for holding or tearing their prey, rather than climbing. The extremities of the lion are the most perfect specimens of this conformation.

As these extremities, however, are destined for the services and support of a large body, Nature has also bestowed upon the animal legs adapted to free and extensive motions, and terminated by hoofs, which vary according to the genera in which he ranks—in some

being limited to a single one, as in the horse—the ox with two, or the divided hoof. In those mammalia essentially aquatic, such as the seal, etc., they are transformed into fins; nevertheless these organs possess the basis of the same structure as the arm of a man, the paw of a dog, or the wing of a bat; this is more evident in the herbivorous cetacea, which, having the faculty of crawling on land, possess extremities more flexible and bearing a greater resemblance to those of the higher classes of mammalia. Let us now proceed to a close survey of the different orders.

## FIRST ORDER.

### BIMANA OR TWO-HANDED.

#### MAN.—ORGANIZATION OF THE BODY.—PRINCIPAL RACES.

The feet have broad soles, on which the animal rests while walking—five toes complete the extremities. The hands have five fingers, with the thumb opposed. The great development of brain produces the prominence of forehead; his position is upright, and his vocal apparatus enables him to articulate sounds, by which he expresses the various thoughts and emotions of his mind. His food is mixed.

(HOMO SAPIENS.) MAN— $\frac{4}{4}$ ,  $\frac{2}{2}$ ,  $\frac{1}{1}$  0.

Man is distinguished from all other mammalia, not only for a more perfect bodily structure, more varied faculties, more elevated intelligence, and greater capability of improvement, but while other animals pursue the instincts of life, as it seems mechanically, he is able to

understand the wonder of his own creation and acknowledge its Great Author—for he is gifted with the faculty of reason. The language of animals, expressed in inarticulate tones, is but the effect of natural emotions, suggested by the desires, wants, passions, such as pain, anger, etc., whilst the speech of man is the utterance of words, which are the messengers of thought and feeling. These thoughts and feelings are of a twofold nature; they are either acquired by impressions made by the surroundings which constitute external life, or proceed from internal images made by the senses, or are the peculiar creations of the soul, which exists independently of the senses, although it acquires all its information by their means. This faculty of intuition, possessed by every human being in greater or less degree, is also shared in by the higher classes of animals. By intercourse with his fellow-men all his faculties are improved; he discovers new arts, which subserve the general good; and with a knowledge, which is the result of this education of experience, his intellectual powers improve and awake to vigorous action. This is not the case with animals; intercourse with each other does not improve them; governed by instinct, they remain stationary, and although capable of being educated by man, they do not educate one another. From this association of human beings with each other, the natural affections are enlarged—love of kindred, of kind, and of country, together with a spirit of universal benevolence, are the fruits of it. But, to this favorable view there is a shadow. If man alone has the capacity of originating ideas, he is also the only animal who, from intellectual promptings, will persecute and injure those of his own kind who stand in his way; the natural incentives to hostility—namely,

jealousy, anger, or the necessity of providing for the animal wants he has in common with all other living beings, but he is the only creature who, actuated by ambition or resentment, will harass and persecute his own kind.

Man, in his infancy, is more helpless than any other animal. He does not arrive at maturity until his twenty-fifth year; after thirty-five, mind and body begin to decline; seventy marks the limit of his age, and, although some few reach ninety, they may be said rather to exist than live. There are, indeed, exceptions to this rule—but examples are rare. One of the most remarkable instances of longevity in the present century was the famous Thomas Parr, a native of England, who died at the age of 152; he cultivated his own fields in his 130th year, and was still strong and vigorous at 140.

It is not in intellectual power only that man exhibits an extraordinary superiority over the brute creation. His general structure being more perfect, gives him greater advantages in skill, address, and endurance, particularly when he trains his physical power into vigorous action, as is the case with savages. The Indians of North America can follow a trail by the scent with as much accuracy as the best hunting dog, and so great is their swiftness of foot, that they will overtake a deer in full run.\* A practiced walker will pass over twenty miles in a day, for days together, at the same time carrying twenty pounds weight; the best horse, burdened only

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\* The bodies of men, though not so ductile as their minds, are capable, when properly managed by early culture, of wonderful exertions. Men accustomed to live in polished societies, have little or no idea of the activity, courage, patience, and the persevering industry of savages, when simply occupied in hunting wild animals for food to

with the weight of his rider, could not do so. This fact shows plainly the superiority of man in physical strength and in the power of endurance over the four-footed race. In the early times, when knights wore armor and practiced athletic exercises, it was not uncommon for men to exhibit their prowess in contests with savage animals. Some such are found in the present day.

The human race is divided into five varieties, which are distinctly marked by the color of the skin. These varieties form the following races: the white, or Caucasian; the yellow or Mongolian, or Tartar; the red, or American; the black, or Ethiopian; and the brown, or Malayan. Modern naturalists distinguish between the races which have a traditionary history and those who do not date back to any particular era for their origin. It is shown that not only in the ancient world the most celebrated nations belonged to the white, or Caucasian race, but that the superiority still exists and maintains a decided ascendancy over all other branches of the human family. It is probable also that the original human family was made up of only three races; that the white, the yellow, and the black races sprung from one ancestral era; the other two are mixed or compounded from the others—the red belonging to the yellow, and the brown being the result of union between the yellow and the black.

These three races, tracing their beginning from different ancestors, and claiming antiquity from the same period, are generally admitted to be the original varie-

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serve themselves and their families. The hunger, fatigue and hardships which they not only endure with fortitude but despise, would amaze and terrify the imagination of any civilized European.—  
SMELLIE. NAT. PHIL.—*Tr.*

ties from which all the succeeding different generations have been transmitted.

First; *the white, or Caucasian race*, plate 1, fig. 2. The individuals of this variety are distinguished by the symmetry and beauty of their personal development. Their heads are of an oval form; the forehead large and full; the eyes occupy a horizontal position; the nose is in perfect proportion—altogether the features are regular and distinct, the hair smooth and long, the beard thick, and the skin white. It is called Caucasian from its original dwelling-place, which, as tradition tells us, was originally among a group of mountains (Caucasus) lying between the Black and Caspian seas. It occupies all Europe, the western part of Asia, the most northern part of Africa, and has been transplanted into America. The Caucasian race has also been distinguished for superior moral and intellectual qualities. Always progressing, they have acquired and maintained a decided ascendancy over the people of other races; their traditionary history, founded on truth, is of great antiquity, and having been for ages the depositaries of literature, science, and the arts, they have carried the human character to the highest degree of excellence. This race is divided into four branches; viz., the European, Scythian, Indio-persian, and the Aramean.

The European branch has the whitest skin, with the hair long, soft, and of all shades, from a light flaxen to the deepest brown, but seldom black. Six families make up this branch, of which three—the Roman, Teutonic, and Slavonic nations are at present the most conspicuous, and have at all times contended for the supremacy. The Teutonic and Scandinavian branches (which include the Swedes, Norwegians, and Danes, as well as the



Netherlanders and Anglo-Saxons), have always taken the precedence in energy and intellectual power. To this follows the Roman, whose intellectual progress in the early ages was far greater than at the present day; this embraces the Italian, French, Spanish, and Portuguese nations. The Slavonic family, which occupies the east of Europe, comprehends the Polish, Lithuanian, Russian, and Servian nations. The three less distinguished are the Celt, the Basque, and the Greek nations. The first are found in Scotland, Ireland, and England; the second occupy a small extent of country among the Pyrenees; and the Greeks, who have sadly degenerated from their energetic and refined ancestry, still inhabit Greece.

To the Scythian branch belong the Finns, Turks, Circassians, and Magyars, which last-named race have dwelt in Hungary for many centuries.

The Indio-persian race, with the exception of the gipsy tribes, which pursue a wandering life over the face of the whole earth, dwells in Asia, and takes within its circuit the Georgians, Persians, and Hindoos. They are distinguished from the above-named races—from the browner color of their skin—on which account many deny their relationship to the Caucasian family, although in intellectual development there is no difference.

The Aramean family comprises the Jews and Arabians, who claim the same descent. The ancient Egyptian, Carthaginian, and Phœnician nations were once included within its limits, but they have long been extinct.

Second; *the Mongolian or yellow race*, plate 1, fig. 2. The hair of this race is straight and black, the beard very thin, the head rather of a square form, the face flat, the nose small and rather depressed, the eyes narrow

and oblique, and the cheek-bones very prominent. This race is separated into three families—the Chinese, Mongolian, and Hyperborean. Their intellectual qualities are inferior to those of the race above mentioned; they have comparatively speaking made but slight progress in civilization or literature, and have generally remained in a semi-barbarous state. To the Sinic branch belong the Chinese and Japanese, together with the inhabitants of the Corea. These three families are the only specimens of the race who have attained to any high degree of mental improvement; they are also less dark in complexion than the others of their race, in this respect bearing stronger resemblance to the Caucasian.

The Mongolian branches inhabit Middle Asia, where they lead a nomadic life, wandering over the mountains and steppes with their flocks. They are easily distinguished by their olive complexions and sturdy frames. The Mongolians, Mandschus, Tungusians, ect., are comprehended within the same limit.

The Hyperborean branch inhabits the polar regions, and lives principally by hunting and fishing. Their color is a dirty olive, and their bodies weak and diminutive. In this division are arranged the Lapps, Samoiedes, Kamtschadales, Esquimaux, and Ostyacks.

Third; *the American or red race*, plate 1, fig. 3. In respect to bodily formation the American holds a middle place between the Mongolian and Caucasian. In common with the one, he possesses the straight, coarse, black hair and scanty beard; but his features are more strongly marked, and his eyes are large and of frank expression. His skin is of a yellowish red or rather of a copper tint. Although generous and hospitable, he is nevertheless cruel and revengeful. He has no tradition-

ary history that carries him back to a beginning;\* but, like a child, lives only for the enjoyment of the present moment, and never calculating for the future. He is extravagantly fond of strong drink, and indulges in spirituous liquor to excess. The race is divided into two families—North and South Americans. The North American Indian differs from his southern brother in having a more cinnamon-colored skin, is of larger size and more powerful constitution; his mental organization is also greatly superior; preferring the wandering life of a hunter, his more vigorous intellect enables him to comprehend all the mysteries of the chase, by which he lives and provides with a sagacity altogether remarkable. He endures pain with great fortitude, and is unwearied by toil, but cares little for the comforts of a home, and of the most common useful arts he knows nothing. The most important tribes of North America are the Lenapes or Delaware Indians, the Iroquois, of whom the Hurons are a collateral branch, and well known, together with the Osages, etc.

The South American race is of slighter figure, and their complexion is more olive than red; neither can they boast of the well-developed nose of the Northern Indian, but have this feature of the flattened type. That at a very early period some advance had been made in the arts is certain, not only from the accounts given by

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\* They state their origin as follows: "We are only a family from a great rich nation beyond the setting sun, as far as Indians travel in two moons. Our fathers dreamed that towards the setting sun was the land of life. Our fathers then travelled—came here. This is the land of life, for our great Father's children know more than Indians."—Bullen.—*Tr.* The Araucanians, Peruvians, Mexicans, Iroquois, and Chippeways all have traditions of their ancestors having come from the west or northeast.

the first conquerors, but from the broken relics of palaces, temples, monuments, and other objects of art found scattered amid the wilderness. But of this civilization of the ancient Mexicans all trace is lost in the present race. Some tribes, however, still exhibit much ingenuity in the mechanic arts; and in the manufacture of mats and basket-work, they enter into competition with the best workmen in Europe. The South American race is divided into many families, some of whose names have been deemed worthy of record. The most important at present are the Caribbeans and Arrowauks; these families show themselves the most skillful in weaving, osier-work, and the making of earthenware; the Botocudas, who are distinguished by a circular hole in the under lip, in which they insert a piece of wood, which causes the mouth to protrude in the oddest manner. The Mexicans, who have, to this day, preserved their native language pure—the Peruvians, and Araucanians—the latter an independent people, dwelling among the Andes—the Patagonians, found in the most southern region of America, from their uncommon stature, of which travelers have given exaggerated accounts, are considered as a race of giants. They are a restless, roving people, living a nomadic life among the Savannas; and last of all the Pescherais, who inhabit an island (Terra del Fuego) at the southernmost point of America, and occupy the very lowest rank as regards cultivation.

Fourth; *the brown or Malay race*. This class of the human family is found in the islands of the Pacific, principally in Polynesia—of middle stature and well formed. They have brown or smooth black hair, and their color is a tint between a yellowish olive and brown. They have no traditionary history, nor any trace of ever having

had one. They are not wanting in intellect, although their intellectual vigor is directed more to the world without than contemplating the mysteries of the internal, as their rude manufactures are really wonderful, and evince the greatest ingenuity. They are very excitable, whether in love and friendship—hatred or revenge. They are divided into three families; first, the true Malaysans, who inhabit the peninsula of Malacca, Moluca, the Philipines, Celebes (the natives of which, called Macassars, are unconquerable), Java, Sumatra, and Madagascar. Everywhere they show themselves an independent people, maintaining their liberty and rights with a courage truly admirable, but often degraded into cruelty. Like to these in character is the Micronese family, dwelling in the Caroline and Mariana or Ladrone Islands. The third family, which comprehends the inhabitants of the Sandwich, Friendly, New Zealand, Marquesas Islands, forms an exception to the general rule of savage existence; they are described as being of an affable and gentle character, and surpassing all the eastern nations in symmetry of form and regularity of features. They are fairer in complexion than the other Malays, and are of mild and docile nature.

Fifth; *the black or Ethiopian race*, plate 1, fig. 2. This race, which is divided into innumerable tribes, of whose character very little is known, inhabits Africa, part of Asia and Polynesia. Many negroes are found in America, some in a state of slavery, others free; and there are places where, having once been slaves and run away from their masters, they live in the woods, and thus many of them have become half savage.\* They

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\* There is a collection of wild negroes found in the interior of Dutch Guiana. Their origin is to be traced back to the year 1667,

are remarkable for their short and woolly hair, narrow and ape-like foreheads, flat, broad noses, thick lips, projecting jaws, and crooked legs, without calves. Their color is a sooty brown or black, and they are divided into two families, called the eastern or western branches.

The western branch dwells in Africa, and constitutes the true negro; the natives of Sudan, Guinea, Congo, and Senegambia are the most perfect specimens of the generic type. The inhabitants of inner Africa (Burnu), as well as the Caffres, dwelling in the southeast extremity, differ somewhat from the other tribes, by having less woolly hair, with better features and lighter-colored skin—being more brown than black. The Hottentots live in the south of Africa, at the Cape of Good Hope, and are the most defective in form of all the human race. Their heads are flat, and with thick lips, protruding mouths, and broad noses, greatly resemble large apes.

The eastern branch of this race, or the negroes of Polynesia, are brown rather than black—a tint made up of black and yellow—and only resemble the other tribes in having thick, woolly hair. The Papuans, who inhabit New Guinea, and the Tabuans found in New Caledonia, etc., are conspicuous for their cruel and treacherous dispositions—they are cannibals. Among these also are

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when the Dutch obtained possession of Surinam. Many of the English planters at that time removing their effects, considerable numbers of their slaves deserted and ran into the woods, where they were joined by other runaways. When the French attacked the colony in 1712, the Dutch planters, to prevent an insurrection of their slaves, removed them into the interior. Many of them improved the opportunity to desert to the Aucka or bush negroes. From that period they became a formidable body; their headquarters were the forests high up the Surinam. They are called Aucka or bush negroes, and are constantly increasing in numbers by the accession of runaway slaves.—*Tr.*



comprehended the natives of New Holland and Van Dieman's Land, who, from want of capacity of being civilized and hatred of social improvement, are a great hinderance to the moral advancement of those far off lands.

### THE MIXED RACES.

#### SKELETON.—BONES.—MUSCLE.

The mixed races are those which have arisen from the union or intermarriage of the primitive races, and more or less resemble the original stock, according to the greater or less degree of relationship. This class, found more generally in America than other countries, is reckoned according to the gradations of color. The child of a white father and a negro mother is called a mulatto, plate 1, fig. 4; that of a white and a mulatto, mustizee or terceron, plate 1, fig. 5; of a white and mustizee, pustize or quadroon; and that of a white and pustize, kastize or quinteroon. The distinction in all these, is very apparent in the length and texture of the hair and different degrees of color, which varies from a nut-brown to bright yellow. The American Indians, much resembling mulattoes in complexion, the child of an Indian and European is called a mestizo or mustee.

The offspring of mulattoes and negroes, or Indians and negroes are called Samboes; their color is something between bronze and copper, and their hair holds a medium between straight and crisp. It requires much observation to determine between the distinctives of these classes—and to a European the task is almost impossible. The term creole is commonly understood as meaning the children born in America of European parents. It is used, however, in reference to all emigrants and even to

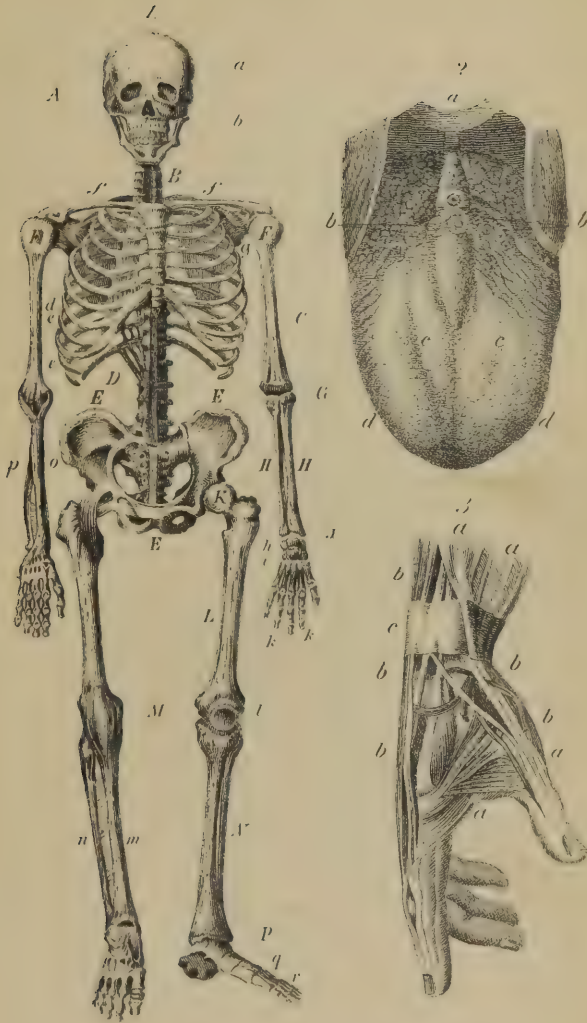
animals. The children of negroes are called creoles, and they have creole horses and creole chickens, meaning by such terms all animals native in the colony. The European creoles are without the rosy complexion which is the Caucasian attribute or type, and all emigrants, after a few years' residence in a tropical climate, lose that characteristic mark in a brown or rather bilious hue, which is by no means becoming to its owner.

A representation of man's intellectual powers, belonging rather to anthropology than to natural history, we shall not enter into any detail on that subject, but proceed to explain the organization or machinery of the body.

#### ORGANIZATION OF THE BODY.

We shall first treat of man, who, possessing the most perfect conformation of organs, stands at the head of the animal chain, preëminent alike for his superior physical conformation and his intellectual capacity.

That assemblage of bones which serves for a foundation for the body, is called the skeleton—plate 2, fig. 1. Its office is to give form to the structure, to cover and protect the various internal organs contained in its cavity, and to serve as levers on which the muscles may act to give it activity and locomotion. Bones which serve to form the cells enclosing the more delicate organs, stand in closer or more distant connection with each other, as may be requisite. The bones forming the cavity of the skull—*a*, eye-sockets—*b*, and pelvis—*E*, have their processes firmly joined together; those of the ribs—*d*, *e*, and the vertebral column—*B*, *D*, are less flexible. Bones which represent the levers for muscular action, are molded with peculiar regard for adjusting its influence,





and their shapes give a direction to the efforts of the muscles, whose function it is to perform the movements of the body, according to the will of the man. They are either immovably joined together by having their processes fixed into corresponding cavities, or by the uneven and rough edges laid together, as in the skull and eyebones—by cartilages as between the ribs and breast-bone, or ligaments, as in the pelvis, hands and feet—*J. P.* The ligaments by which all the bones are united so as to form movable joints of various degrees of power, have a remarkable fitness, provided by nature, for performing their office. The surfaces which move upon one another, as well as the ends of the bones inserted into their corresponding cavities are covered by a smooth polished substance that renders all their motions easy and free from impediment. A very strong and stout ligament fastens the bone into its socket—a shallow, cup-like receptacle—and this, with another tendon on the outside, keeps it in its place without injuring the motion of the joint. This socket or case is, although shallow, a firm, thick bag, perfectly air-tight, which, like a ligament, binds the bones together, keeps their heads and processes in the right places, contains that glairy liquor with which the heads of moving bones are lubricated, and prevents the adjacent parts from falling inward or being caught between the bones in the bendings of the joints. These joints are of great importance in the movements of the body, for, although the muscles are the appropriate organs of motion, each one, supporting its share of the weight of the limb, accomplishes only its own appointed action. The bones which serve many different purposes, can not bear exposure to the air; the teeth, however, make an exception; of them,

however, we shall speak again. The bones and ligaments, although possessing some circulation, are by no means rich in blood; they are callous and insensible, having little action in their natural state; therefore, in the operation of amputating a limb or trepanning the skull, no pain is felt from the sawing of the bone. In disease, however, their sensibility is excited in a high degree. Their structure is partly solid and partly spongy; many of them are hollow or filled up with tubular cells, which contain a fatty substance called marrow. Those of the compact or solid order, such as the skull bones, ribs, and bones of the legs and arms, if broken, are capable of perfect restoration; but the spongy or more cartilaginous, such as the ends of the ribs, the flexible substance at the ends of the hollow bones, or those composing the structure of the hand and foot, if injured, can seldom be properly replaced.

The muscles, plate 2, fig. 3, are the true organs of motion, and constitute the real flesh, and, as any one can discover in a piece of roast beef, are made up of minute, red-colored threads or filaments, which run parallel with each other, and are called fibres. These minute threads, bundled together in masses, form the body (ventriform) of the muscle. The muscles are connected with the bones, more or less, by long tendons, plate 2, fig. 3, *b*, which are of a glistening white color, and perform the office of keeping the muscles in their proper places. This connection is so strong, that if, in consequence of any sudden or violent movement there should be any tearing of the part, the bone or muscle itself would be more certainly broken than that this uniting cord should give way. It is only the muscular fibres, however, that give muscular action. They are



the active agents in contradistinction to the bones, tendons, and ligaments, which latter, although elastic and of importance in the body movements, are nevertheless passive instruments under the influence of the muscles, since they do not contract. The muscular fibres, either in extension or contraction, are kept in their proper places by a large, tough substance, also possessing muscular power, which, acting with them, increases their effect, and covered with a bluish and glistening skin, is well known to every cook by the name of whitleather. The best developed specimen of this kind is the bracelet-like band which, passing round the wrist, confines the tendons which move the fingers, and keeps the muscles of the hand in their place, plate 2, fig. 3, c, and besides assists in the strengthening and harmonizing the whole. There are, however, two kinds of muscular power, and the one of which we have been treating, regulates the voluntary movements of the body and limbs. There are other muscles, however, which, generally independent of bones, perform their offices in the interior of the body, and are not subject to control from the will. To this class belong the muscles of the throat, stomach, bowels, and also those of the heart—that restless agent, whose never-tiring muscles sustain the circulatory process from the first moment of life until its closing hour. The operations, however, of all the muscles depend on the more or less vigorous influence of the nervous system.

The manner in which the muscles are united with the bones varies considerably, but, generally they are so placed as to act as levers; and the nervous power, which is inherent in them, gives strength to their operations and enables the body to move with vigor and precision.

It is said to be the regulator of the system; it is the property suited to all the supports of life, upon which they act and by which they maintain their power over the body; it is subject, however, to perpetual changing; it rises or falls, is perfect or low, but the muscular power is always perfect and ready to obey the commands of the will.

The muscles are surrounded by the cellular substance. This membrane is a kind of network made up of irregular cells, which not only serves to protect the muscles and their fibres, but is particularly useful to the other organs of the body; it also surrounds the cells which contain the fat. The arrangement of the cellular membrane is one of the many wise and providential regulations of the Great Creator for the sustaining of the animal economy. It is most important to life, as its principal office is to form a structure for the deposit of fat, which is to serve as a storehouse in case of necessity. When sickness has disarranged the animal process, and the digestive organs fail to perform their usual functions, or deprivation of food ensues, then it is that nature draws on this receptacle of stored up fat, which serves as nourishment to the lamp of life, and keeps it from dying.

Over all this structure of bone and muscle, which gives shape to the body, is spread a universal covering—namely, the skin, the hair and nails, both of which spring from it. We give a specimen of a piece of skin, consisting of its several coatings, in plate 3, fig. 2, which will give a plain idea of its texture. The true skin, *c*, called the chorion or derma, is of a strong texture and of a greater thickness than is generally believed. When tanned, it is about the thickness of deer-skin. If removed to the whole depth, it is never replaced by a like sub-

stance ; the injured spot, when healed, is covered with a white cicatrice or scar. The malpighian net, plate 3, fig. 2, *b*, is of a network texture, entirely separated from the epidermis ; its office is to give color to the skin, as is seen in the different hues which mark the human race. The epidermis or scarp skin is a very thin cuticle, perfectly insensible, which, frequently removed from various causes, is so speedily and quietly renewed as to occasion no notice. It serves as a covering for the cutis, which is full of nervous power and is very sensitive. The pores have also their origin in the skin. Their office is to separate the perspiration, a watery fluid, from another secretion of a more oily nature ; the latter serves to lubricate and keep the skin soft. The perspiratory pores, *e*, lie deep in the cutis, and send through winding canals, *f*, the watery fluid to the surface. The pores for the oily secretion go no deeper than the upper surface, and exude their liquid secretion from little hollows they form there.

The nails and hair are the other productions of the skin. The first are a horn-like fabric situated on the end of the extremities, issuing from a fold of the cutis, which, filled with nerves, is very sensible of pain ; this junction is called the root of the nail, and when wounded, will bleed profusely. The little cushion-like swelling is the foundation of the formation of the nail, and no matter how often the nail itself is removed, as long as this remains uninjured, it will grow out again as sound as ever, while, on the other hand, if the root is wounded, the nail is lost forever. The hair, which is a great ornament to the human head, is a curious study. Each hair contains small openings, which are lined with the finest cellular substance. At the root is a kind of bulb or

husk, containing little pores, which furnish the coloring-matter for the hair. If these dry up, the hair becomes white. There is also another set of pores by which the nourishing aliment is provided ; these sometimes dry up, and then baldness ensues. Premature baldness and grayness of the hair are peculiar to some families, for the cause of which no satisfactory reason can be given. Negroes often become gray in middle life, whilst the hair of the Mongolian and Indian retains its dark hue to the last. The hair has been known to turn white in the space of a night ; terror, sorrow, and anxiety are said to produce these sudden changes, and man, ever inventive, has sought to find a remedy by using coloring-matter to restore its natural hue. All white hair contains a portion of sulphur, and therefore mineral preparations are used, which, mingling with the sulphur, turns it black. The oxide of lead is the one most commonly preferred. No specific against gray hair or the baldness common to advancing life, has as yet been discovered ; but when the hair falls off in consequence of sickness, nature restores it as health returns.

Having described the organs which constitute the exterior of the human body, viz., bones, muscles, cellular substance, and skin, we proceed to point out, first, the divisions of head, trunk, and extremities, and, farther, the subdivisions of breast, abdomen, etc., into which they naturally fall.

After giving a short consideration to the organs by which the important functions of nourishment and circulation are carried on within the cavity of the body, we shall endeavor to describe those higher functions themselves in the operations of the circulating system and still grander arrangement of the brain, not forgetting

the respiratory process and mediums of perception. Let us begin with the organs of digestion.

The food of man is made up of animal substances, all created things being under his subjection. But as neither his teeth nor digestive apparatus are fitted to prepare these materials in their rough state so as to make it suitable for the nourishment of the body, so would the tender roots, fruits, etc., furnished by the kind prodigality of Nature be useless to him, had not the same Beneficence which bestowed the gifts, prompted the manner in which they could be made profitable. By the art of cooking, the food is not only made more palatable to the taste and rendered capable of being operated upon by the digestive organs of the human being, but serves to form a distinctive mark between him and the brute creation, which, although nourished by the same material, feed upon everything in its rough state.

The change which the food undergoes before it is fitted for the use of the body is as follows: first, gathered or killed, then divided, the necessary preparation by cooking is made; then, taken into the mouth, it is mixed with the saliva, and, by the action of the teeth and jaws, ground into a kind of paste; this passes through the gullet (esophagus)—a long, muscular canal—into the stomach, where it is acted upon by a peculiar fluid called the gastric juice, the operation of which, on the substances received, is very decided and powerful. They are gradually reduced to one homogeneous mass called chyme, this being subjected to the operation of the bile and pancreatic juice—a fluid secreted by a gland in the abdomen, and sometimes called the abdominal saliva gland—is separated into two parts. One of these, a thin, milky fluid, called chyle, is carried by the lacteals

through the body, and forms its nourishment; the other part, possessing no property useful for the maintenance of the system, is rejected and thrown off. As the seed must die in the earth before a new plant can spring forth from it, so must that, which once possessed the living principle, be destroyed for the maintenance of another life, thus showing that over all, life has its root in death.

The mucous membrane, commencing in the mouth and forming a lining for the whole intestinal course, is composed of innumerable glands, whose office it is to secrete a glairy fluid necessary to give lubricity and protection to the parts. The salivary glands have also their origin in the mouth; these facilitate the passage of the food into the stomach; next is the coating of the stomach and intestines, all assisting to form the necessary apparatus for the important work of digestion; with these, also, are others, each performing its especial duty; the glands of the liver, pancreas, and other organs, secreting, absorbing, or throwing out, all aid in the promotion of the life which is going on.

As man is incapable of using his food in its natural state, but, for the most part, prepares it, his teeth are not, as in brutes, formed for retaining the prey or to serve as weapons of defense, but for the purpose of masticating the substances necessary for his support. These teeth, which, although they seem greatly to resemble the common bones, nevertheless differ greatly from them. They are of peculiar form (the central portion is of a substance similar to that of the common bones), and are covered with a hard, glossy coating called enamel, which begins at the neck of the tooth and fashions the surface of the crown; the roots, planted in cavities in the jaw have no enamel, it not being necessary. Its



office is to protect the teeth from injury, and every one knows, that, as soon as a portion of the enamel is broken, the tooth begins to decay and is soon lost, unless the air is excluded from the cavity—a very common process—and which is often accomplished by artificial means. The first teeth, twenty in number, are called milk or deciduous teeth; they are smaller, whiter, and of more frail texture than the second set, which are called adult or indemnifying teeth; the first-named mostly make their appearance in the beginning of the second year, and are completed in the third. In the seventh and eighth year they begin to fall out, continuing even to the thirteenth, and for this peculiar reason: the gums of the permanent teeth are already formed in the jaw below the others, and pressing upon their roots, force them from their sockets, and take the places thus vacated. In plate 3, fig. 4, there is a representation of this process. The three permanent teeth—which are never shed—arise at very irregular periods, and very late; these are the back teeth. The third appears mostly between the sixth and eighth year; the fourth from the fifteenth to the eighteenth, and the fifth, or wisdom teeth, at different intervals, between the eighteenth and thirtieth. The lower jaw, plate 3, fig. 1, *b, c*, in which the teeth are firmly set, is moved against the upper, which is stationary, by means of strong muscles; the tongue, *e*, lies between the jaws behind the teeth, which, aided by the energetic action of the muscles of the tongue and cheek, perform the office of grinding the food in a manner resembling that of millstones. Whilst this masticatory process is thus going on, the salivary glands are throwing out their fluids, by which the mass is reduced to a pulp, and at last, formed into a ball by the tongue, it is passed into a

long muscular canal, called the gullet, *g*, and conveyed to the stomach.

So far, the motion is voluntary, but another set of organs are now brought into use, which are altogether independent of the will. In order that no part of the chewed material may enter the trachea or windpipe, the latter is covered with a cartilage called the epiglottis, which, closing over the food received into the gullet, presses it into the stomach. This organ, plate 3, fig. 3, *a*, is a large muscular sack, in shape resembling a bagpipe, lying under the diaphragm and false ribs. The upper part, situated rather to the left, is called the esophagial or cardiac orifice, and the lower opening rather to the right, has been named pylorus (porter), because it opens or closes the passage from the stomach into the intestines. The stomach is lined with mucous membrane and filled with nerves and various vessels necessary for the digestive process. On the left side below is the spleen, a strong, vascular, porous organ, which lies against the large end of the stomach, the peculiar use of which is not understood. The food being masticated and swallowed, the important work of digestion begins. Different agents are employed to operate upon the rude material with which the stomach is filled; the most active of all, however, is the gastric fluid, which, oozing out from all the inside lining of the stomach, becomes mixed with it. Both openings being closed, a kind of churning motion is kept up, by which the mass gradually becomes changed into a grayish cream-like substance called chyme. A superabundance of fluid taken into the stomach can be absorbed by the numerous vessels belonging to that organ; yet, as it weakens the gastric juice by thinning

it, it is quite clear that the practice of drinking at meal-times is very injurious.

The intestine or alimentary canal, is a long membranous tube, folded upon itself, which forms a continuation of the stomach, and which, by its outward extremity, opens outwardly. It is lodged in the abdomen, and is retained in its place by folds of a very fine membrane called peritoneum, which line the parietes or walls of this cavity. The walls of the intestine are furnished with fleshy fibres which surround them, and which, by contracting successively, push forward the matters contained within this tube. The folds of the peritoneum which connect the intestines to the spine is called the mesentery. The intestinal tube lies in the cavity of the abdomen, and with ceaseless activity performs in its winding course the peristaltic motion, also termed vermiform or vermicular, because the movement resembles the windings of a worm. It is by this action that the nutritive portion of the food is separated from the refuse. The small intestine, plate 3, fig. 3, *c*, lies directly behind the pylorus (gate-keeper) of the stomach, and is subdivided into three portions, called duodenum (twelve-fingered), jejunum, and ileum. Its length is considerable. The whole intestinal canal is lined with three coats, of which the inner one is thrown into rugæ or valves. The mucous membrane is, in consequence of this arrangement, more extensive than the other tissues, and has imbedded under it innumerable small glands, each of which perform duty as an active agent in the digestive operation. These several coatings and some of the glands, are distinguished from each other by their several uses; three in particular, the first of which is spread over the whole of the small intestine, the second found in the duodenum,

and the third in the ileum, have been named after their discoverers, as Lieber, Brunner, etc. Each of these, as already stated, perform a separate work and differ in appearance, but the whole membrane, from having in its substance a great number of piles like those upon velvet, is sometimes called the villous coat. Every portion of the aliment received into the stomach is, through its contact with the mucous membrane and operation of the gastric fluid, converted into the gray homogeneous mass already described. This having reached the pylorus—a thick ring-shaped valvular organ—is in its turn passed through this orifice into the duodenum and afterward through the other continuations of the small intestine, where it undergoes a farther and more essential change. The bile, a bitter fluid of a greenish color, which, in its composition is alkaline, glutinous, and fatty, and secreted by a large gland, which, lying under the diaphragm and behind the false ribs, is called the liver, plate 3, fig. 3, *b*, passes through the biliary conduits into the duodenum, where, mixing with other fluids, the combined action changes the chyme into chyle and residuum. It is not, as is generally supposed, found in the stomach when that organ is in a healthy state, but, on the contrary, is stored up in a membraneous sac called the gall cyst, which is attached to the lower surface of the liver, and is considered as its proper reservoir. Whilst the process of digestion is going on in the intestine and the stomach is comparatively empty, the liver is busy forming a new supply, which, deprived of its watery portion by absorption and concentrated, is made ready for the next occasion. The mucous fluid prepared by the pancreas—a long, flattened gland analogous to the salivary—and lying behind the stomach, is carried into the duodenum by a duct opening

into it, and mixing with the bile, the concentrated action separates the chyme into two parts, one of which, called chyle, is white and milky, the other is the residuum. All the fluids, thus poured out from their secretory glands into the intestinal canal, viz., the saliva, bile, gastric juice, etc., operate chemically upon the mixture, modify its properties, and serve to assimilate it to the body, so that at last it becomes a component part of it. Attempts have been made to imitate, by artificial means, through chemical agents, the mysterious process of digestion, in order better to understand it; but as the organism of the human body differs greatly from the apparatus of a laboratory, and another law obtains—namely, that which governs the functions of a living system—rather than the power of chemical affinities, no satisfactory result has been obtained. All effort has ended in the knowledge that, through the combined operations of the organs of the alimentary canal, a fluid is produced from the rude elements used as food, which, subjected to the intestinal agencies, becomes suitable nutrition for the body. The digestive process begun in the stomach, therefore, seems but preparatory for the more important operations of the intestinal organs, from which it may be more fully proved what has already been asserted, that the animal organization, equally with the vegetable, has its roots internally.

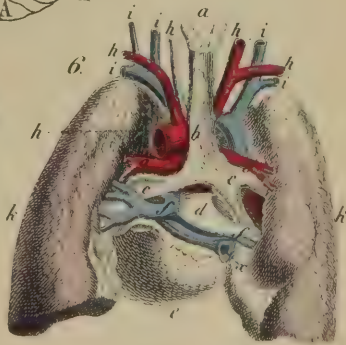
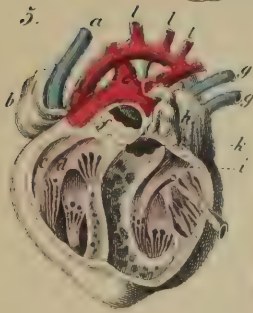
The mesentery—a tough, serous membrane—connects the small intestine with the spinal column. It is filled with innumerable fine glands; these are the lacteals, which, surrounded by minute ramifications of the blood-vessels carry their branches along the whole tract of intestine, commencing in the villous coat. These lacteals

imbibe or take up (endosmose\*) the chyle, and transfer it to the mesenteric glands; these are nothing more than a pile of absorbents, which, being first fashioned and afterwards lost, are found between two layers of the mesentery, for out of each mesenteric gland proceeds a large absorbent. In plate 4, fig. 1 and 2, these mesentery glands are represented, wherein the interior structure, consisting of innumerable absorbent vessels, is clearly shown. Fig. 3 exhibits glands of a granulated form, such as those which furnish saliva and mucus; these are found to consist of a bundle of fine glandular substances, bloodvessels, and nerves, which are bound together with cellular texture; proceeding from each of these glandular grains is a small canal or duct, which binds it to a similar one, until all unite in one grand canal, which ends the course. Although greatly differing in form and substance, there is still an analogy between the compacted glands—as the liver and kidneys. The sum of all taken up by the absorbents and operated upon by the mesenteric glands, so as to be rendered more fitted for the purpose of life (for this seems to be the office of these glands),—is next transferred into the thoracic duct (the cistern of the chylous fluid) through which it passes into the left subclavian vein, where it mixes with the venous fluid. The process of absorption is carried on throughout the whole intestinal course, but more particularly in the small intestine. The small intestine joins itself to the large, plate 3, fig. 3, *d*, in such a manner as to form a valve over the cavity of the

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\* Endosmose imbibition, a property that permits fluids and gases to pass through membrane in either direction, and also allows two fluids to pass in opposite directions at the same time.—MAG. PHYSIOL.  
—Tr.







latter, so that the contents of the lower intestine can, by no possible movement, be thrown back. There is, indeed, a revulsive movement caused by the action of vomiting, mostly, however, confined to the stomach, though in extraordinary cases extending to both the upper and lower intestines, but on account of the already mentioned valve, the contents of the upper intestine only are thrown back to the mouth. The large intestine is divided into three portions—the cœcum (blind pouch, or cul-de-sac), the colon, and rectum; it is more voluminous than the small intestine, and, with the exception of the rectum, which is straight, the longitudinal fibres of the muscular coat are collected into numberless bands, which, lying on one side and being shorter by one-half than the intestine itself, render it sacculated and capable of great distention. The cœcum is the blind pouch or cul-de-sac, with the appendix vermiformis, a long worm-shaped tube, attached to its extremity, and lies on the inner side of the right haunch bone. The colon presses upward into the region of the liver, where, after bending to the left toward the spleen, it descends to the left haunch bone, where it makes a peculiar turn upon itself, which is called the sigmoid flexure, after which it joins the rectum, which is the terminal portion of the large intestine. Comparatively speaking, little is known of the coöperation of the larger bowels in digestion, as few opportunities of investigation have occurred; in the cœcum, however, the process seems to be carried on the same as in the stomach, but the office of the lower intestine appears solely to be the separation of the residual matter from the nutritive. It is of great importance that the digestive process should be regular and uninterrupted, as it exerts a powerful influence on the health, and, therefore,

certain rules must be observed. Nature will not be outraged, without rebelling, and any infringement of her laws is punished; therefore it is indispensable, that, after a meal, an hour should be dedicated either to rest or recreation by amusing conversation or otherwise, in order that nature may have opportunity to spend all her force upon the digestive economy. Severe manual exertion or mental toil ought to be avoided equally as hurtful, for all organs brought into action require and receive more blood and nervous fluid than when at rest. The quiet hour, however, which is thus enjoined ought not to be wasted in indolence or (except in extraordinary cases) be devoted to sleep, or at least a long siesta, but rather made useful in the economy of health by being filled up with cheerful amusement or spent in social converse.

#### RESPIRATION AND CIRCULATION OF THE BLOOD.

Having given a cursory description of the process by which rude elements, introduced into the body, are made to furnish materials to promote the growth and repair the waste of the system, our next task is to trace the effects of the chyle or nutrient portion of the food, on the organs of respiration and circulation.

The diaphragm is a flexible circular muscle, which, springing from the spinal column, is attached by the lower margin to the ribs, and lying horizontally across the body, separates the chest from the abdomen. Above it, in the cavity of the thorax, are the respiratory organs and the great central agent of circulation; below, in the abdominal space, are the intestines, kidneys, and other organs, provided for carrying on nature's great work in the system.

It has been previously stated from what source the

material for the blood is obtained, and how, by the vigorous action of the mesenteric glands, the nutritious portion of the chyle is transferred into the thoracic duct, to be mixed with the vital fluid. But now, another organization, entirely different, takes place, the beginning of which is indeed found in the thoracic duct, not now, however, a homogeneous mass, but consisting of small granular particles which soon after assume the form of globules swimming in a watery fluid, and become of a red color on coming in contact with the atmospheric air. By the examination of blood drawn from the body, the change will be easily tested. When left standing for two or three minutes, it spontaneously coagulates and resolves itself into the red clot (*crassamentum*) and a yellowish water (*serum*). Wash the coagulum, and it will be freed of the red particles which gave it its color; they will be found in the water, and the coagulum which remains will be a fibrous mass of yellowish white. Therefore the blood has been divided into *cruor*, for so is the coloring matter designated, and *fibrin*. This is not, however, visible in the active and living blood. The coagulum or fibrous portion, undivided from the lymphatic, forms the material which constitutes the vitality of the life principle, and is altogether necessary for the sustenance of the living creature. The *cruor*, which, on a superficial inspection, appears only as colored matter, consists of a mass of numerous minute globules, whose diameter being only  $\frac{1}{50000}$  part of a Parisian inch—twenty-five millions of them can lie within the compass of a quarter of an inch, without being pressed together. The whole mass of these particles constitute the *cruor*, which, serving as the foundation of life, we will now proceed to consider, and prove what is its true office in the living economy.

Just as in a well-regulated state, the government is exercised to this end, that every class shall, according to its capacity and nature, act for, or subserve the public good; and the various classes, of whatever rank they may be, and the citizens themselves shall, according to their talents, functions, and capacities aid in the endeavor to promote the general prosperity. Each one, whether high or low, is esteemed and rewarded according to the usefulness or importance of his work; so also is it in the human organization. The blood is to the body what wealth and power are to the state; and that these powerful agents of its prosperity may be profitably used, every organ, according to the measure of its functional importance, receives its adequate portion, so as to enable it to perform its part in the general welfare. Thus the brain, lungs, heart, and stomach require more red blood than the bones and muscles; the organs of sense—the eye for instance—has greater use for blood than the tendons or sinews. A muscle which is in frequent exercise, demands more of the red blood, and accordingly, that portion of the vital fluid sent to it has a redder color than that distributed to one little used; so the cornea and crystalline lens of the eye, as well as the sclerotica, receive a large portion of the plasma, which is colorless, and but little of the cruor (red globules). And in order that this wonderful and wisely-ordered distribution may proceed uninterruptedly, Nature has instituted the circulation of the blood.

#### THE CIRCULATORY SYSTEM.

The circulation of the blood is a two-fold process; first, from the heart to the lungs and back again to the heart; second, from the heart to every portion of the



body, from whence it returns to the first point of setting out. The first is called the lesser—the latter, the larger circulation. In the first, the blood is carried to the lungs, so that, by coming in contact with the air, it may receive a redder color and acquire more vitality. The greater circulation has the property of sending the oxygenated blood through the whole system by the agency of many organs, in passing through which, it is altered and returned in a perfected state to the heart. This last operation is carried on by means of the veins; these are cylindrical tubes, which, as they proceed further from the heart, ramify through all the members until they are resolved into a fine network, composed of minute radicles termed capillaries. The arteries are those blood-vessels which convey the blood from the heart; the veins, those which return it to the auricles of the heart, which is the great central organ. This important organ, plate 4, fig. 5, composed of muscular fibers and tendons that traverse it in all directions, is divided into four compartments, and surrounded by a sac (heart-case or pericardium), which, secreting a watery fluid, forms its protection, whilst allowing it free action. These separated by a partition or septum into two parts called right and left halves, are again divided each into two parts, called auricle (deaf ear), *b*, *h*, and ventricle, *c*, *i*, so that altogether there are four cavities in the heart. The septum or dividing wall of the heart is a fleshy and muscular substance; the cavity between each communicates with the arteries and veins; and between the auricle and ventricle are folds of thin membrane which operate as valves, *d*, *i* (tricuspid), which are so arranged that the blood can only pass one way. The veins discharge themselves into the auricles; the vena cava, *a*, *a*, springs

from the right, *b*, and the veins of the lungs, *g*, from the left, *h*. The arteries originate in the ventricles. The right ventricle of the heart, *c*, gives rise to the pulmonary artery, *e*, which proceeds from its cavity, *f*, and the aorta, *l*, is found in the left ventricle, *i*, and pours out, *k*, the pure nutrient blood. In order that the mechanism of the heart—which is somewhat complicated—may be better understood, let the reader study the following description of the plan laid down in plate 4, fig. 4. The blood, which is carried through the microscopic network of the capillaries to the lower part of the body, *V A*, reaches the right auricle, 1, by the vena cava, *a*, *a*, and being prevented by the valves, *m*, *n*, from returning to the vena cava, it is forced to enter the right ventricle, 3, through the opening, *b*. This now contracts, and the blood, its reflux prevented by the tricuspid valves, *o*, is driven into the pulmonary artery, *c*, through which it passes to the lungs; the semilunar valves, *p*, now perform a similar office, and hinder its return during the relaxation of the right ventricle. At the extremity of the division of the aorta and pulmonary artery are found the capillary vessels of the lungs above, *V A*, and after the blood has reached the pulmonary veins, it passes through the same, *d*, *d*, into the left auricle, 2, and restrained by the contraction of the mitral valves, its backward flow is prevented; it is now driven into the left ventricle, 4, through the opening, *e*; the valve, *s*, contracting, obstructs its reflux, and it is driven through the aorta to every part of the body, where another valve, *t*, (the semilunar), prevents its returning, after emptying the left ventricle, into the aorta. The blood now passes through the aorta and its branches into the capillary network of the system (*V A*, below). The reader who

carefully studies the course of the circulation as exemplified in our geometrical plan, so as to understand it, will see how beautiful and regular is its arrangement, and however complicated its machinery, all is, nevertheless, in perfect harmony. Of course, in this illustration, the capillary system of the lungs is shown as if separate from that of the body, which it is not; also the valves are represented as being of the simplest form, whereas in nature they are quite the contrary; nevertheless, the illustration is a true likeness of the wonderful and regular mechanism. It shows besides, most clearly, that the circulation is double, or divided into two parts; one furnishing from its minute divisions bright red arterial blood, the other venous, which is more of a purple hue. The first begins at A, in the upper (pulmonary) capillary network, goes to the left ventricle and auricle, then passing through the aorta to A, it reaches the lower (body) capillary system; the second circulation commences in the lower capillaries at V, goes back to the right auricle and ventricle, and, passing through the pulmonary artery, reaches to the point V, in the upper, or lung capillaries, where the first A is once more ready to begin its course.

The pulsation of the heart is caused by the dilatation and contraction of the auricles and ventricles; by the drawing together of the last, the apex of the heart is raised, and beats between the fifth and sixth ribs. This movement, energetic as it seems, is, however, more a kneading than a striking motion, as was proved in the case of a *lusus naturæ* or monster, whose heart lay outside the body. By the impulse given by the strong muscular action of the left ventricle as it throws out the blood, the stroke of the pulse is formed; this phenom-

enon is caused by the pressure of the blood against the coats of the arteries at each contraction of the ventricles, and can easily be felt by applying a finger to the wrist, where an artery is found lying near the bones. The organs of the circulating machinery may be considered as consisting of a number of pipes, inclosed within the body, and the mechanical operation of the heart, as the action of a forcing and suction pump. The auricles, in which the veins originate, are the imbibing vessels, and the ventricles are the propelling power; but as the first operation does not require the same amount of force as the latter, the muscular walls of the auricles are thinner than those of the ventricles; and as the impulse required to send the venous blood to the lungs is much below the force demanded to propel the arterial fluid through the whole body, so the right ventricle, from which the first mentioned jet proceeds, has weaker walls than the left, the latter requiring more muscular power to expel the blood to a greater distance. The arteries which take their rise in the ventricles, in order to resist the shock of propulsion, are provided with a strong fibrous coat, the elasticity of which enables the vessel to accommodate itself to the quantity of blood it may contain; the veins are more delicate in their structure. If the ear is placed close on the right side of any one's chest, two sounds will be heard, the one heavy and full, followed by another, lighter and quicker. These tones proceed from the vibratory action by which the strong muscular valves are displaced during their expansion; the first, which occurs during the contraction of the auricle, is caused by the pressure of the dilated ventricle against it; the last, which takes place during the relaxation of the ventricle, is the effect of the vibratory motion of the valves,

which open on the arterial action. So much for the mechanism of the circulation. The most important work of all connected with the circulation, is that performed by the capillaries, not only in the lungs, but in the body also. In order, therefore, to understand more fully how this process is accomplished, we must make a close inspection of the structure of the lungs.

Parallel with the esophagus, the respiratory organs are found, as represented in plate 3, fig. 1. They begin in the nasal cavity, which is divided by a perpendicular septum or wall, 1, into two parts, forming the nostrils, and extending over the cavity of the mouth, from which it is separated by the hard palate, *d*. The nasal fossæ, or nostrils, terminate near the throat in two openings, *l*. From the lower edge of this opening (choane), or the posterior border of the hard palate, hangs the uvula, or soft palate, the end of which forms the glottis. This movable cartilage, in the form of a little tongue, hinders the food, when in the pharynx, from passing into the trachea during the act of swallowing, as the soft palate, raised from the base of the tongue backwards, closes the posterior portion of the nostrils, preventing all entrance there. By a movement of the muscles of the tongue, mouth and cheeks, simultaneous with that of the soft palate, the food is pressed into the upper part of the pharynx. When the morsel has been swallowed, this valve-like arrangement (epiglottis), remains open, the little curtain falls down perpendicularly, so that there is no obstruction to the passage of air through the nasal aperture into the larynx, and farther, to the lungs. The larynx, plate 4, fig. 6, is found at the upper end of the windpipe, and consists of numerous cartilages. In the inside are two movable ligaments; these are the organs of the voice, and, lying close to

each other, they contract or expand as the muscles of the larynx act upon them, and it is this vibratory motion that, as the air passes through them, makes the voice. The trachea, *b*, or windpipe, is found at the lower part of the larynx, *a*; it is made up of half circular, cartilaginous rings, which are bound together on the posterior surface by a tough skin. Having reached the cavity of the thorax (chest), the trachea divides into two branches, *c*, of which one taking to the right and the other to the left, they enter the corresponding lobes of the lungs. The lungs, *k*, themselves, consist of a fine sponge-like material, made up of air vesicles and branches of the bronchia (air-cells), which end abruptly. The pulmonary arteries and veins ramify everywhere in the mucous membrane of the lungs; their office is to supply nutrition to the part, and bring the blood in contact with the upper air.

Respiration is carried on in the following manner. The lobes of the lungs, plate 4, fig. 5, a posterior view of the lungs, etc., stand forth in the cavity of the thorax, each one inclosed, and its structure maintained, by a smooth serous membrane, called the pleura. The diaphragm, extending below the lungs, forms their basis, and separates the digestive organs from the respiratory. By the movement of this organ from below, a vacuum is formed in the space between the lungs and the chest, and by the power of the aerostatic balance, the air rushes into the lungs; if the motion is from below, the cavity of the chest is diminished, and the air expelled. From this changeful play of the diaphragm, namely, its contraction and expansion, the latter causing inspiration, the former expiration, the breathing process, or, in other words, the admission and expulsion of air into and



from the lungs, is accomplished. This is more or less favored by the elevation of the ribs, as is proved by accelerated breathing. A great difference exists between the blood that flows from the left ventricle, *e*, through the pulmonary artery, *g*, to the lungs, and that which is carried through the veins of the lungs, *f*, back to the left auricle, *d*; we have previously learned that the already used blood is returned through the vena cava, *i*, to the right auricle; from which it is carried to the right ventricle, and, still pursuing its circulatory course, passes through the pulmonary artery, *g*, into the lungs. This blood is a dark purple color. Contrary to this, the arterial blood, that which is conducted through the pulmonic veins, *f*, to the left auricle, *d*, that to the left ventricle, *e*, and then by a powerful contraction of the last-named organ, forced into the aorta, *h*, and thence sent out by all the venous branches, into various parts of the body,—is of a bright red color. The reason of this change is obvious; during inspiration a quantity of oxygen is inhaled into the lungs, while on the other hand, a quantity of carbonic acid gas is exhaled. The action of the air changes the color of the blood. The principal operating agent in this metamorphosis, by which increased vitality of the life-principle is given, is the presence of the red globules, which, now formed and changed in color, are sent, through the arteries, to every part of the body. Upon this ever-enduring arterial process, namely, the renewing of the blood through its peculiar function, touches the important question, whether, without the incentive given by the arterial blood, life could be sustained, and it has unanimously been decided that fresh air is as necessary for the maintenance of the vital principle, as food and drink.

The arterial blood being brought from the heart into the capillary system of the body, the following change is effected. The arteries bring new material for, and send new impulse to, every part of the body; there, the capillaries, give back the unused portion of the blood to the veins, which, mingling with the darker colored fluid they contain, is returned through this channel to the heart, the absorbents assisting in the task. Let the following serve as an illustration. As previously stated, the tubular system, or organs of the circulatory process, operate in a perfect circle, the heart performing the office of a suction and forcing pump. The force with which this organ propels the arterial blood is, at an average, reckoned to be 1.24 kilograms, the medium average of the pulse is seventy beats per minute; the volume of blood in the system of a grown up man is computed at 14.6 kilograms, and the rapidity with which it performs its circulatory round is so great that it is perfected in the space of a minute. The amount of blood contained in the lungs is estimated to be nearly the same as that belonging to the body, its operation is concluded in two minutes; therefore, the blood, in the course of twenty-hours, has performed its circulatory path one thousand, four hundred and forty times. These computations must, however, be accepted as assumptions rather than proofs, for it must be borne in mind that the movement of the blood through the coarser vessels can only be estimated by a comparison with a mechanical process somewhat resembling it. In the capillary system, all comparison with mechanism must be dispensed with, since its movements, at once with that of the blood, and all portions of the machinery of organic life, are dependent upon nervous influence, and the, through it, appointed

organism of the elective affinities. Through these, by means of absorption, the body receives the necessary quantity and nutritive material of the blood; and by the same process the particles of matter that have become injurious or useless are removed from the mass of fluids and solids. It is in the lungs that oxygen is received; the pure or nutrient portion separated, and carbonic acid gas, or nitrogen, is discharged. As it has been observed that both in combustion and respiration carbonic acid was produced, and oxygen absorbed, it has led to the conclusion that the presence of these two agents is the cause of calorification, or animal heat.

There is, however, more rough or refuse material than can be absorbed or retained by the veins, and nature, always perfecting her own work, throws off this superfluous portion, partly by the liver—which is the organ for secreting the bile, a fluid, as already stated, most necessary in the physical economy—and partly by the skin, the numerous pores of which are constantly exercising their purifying functions. Beside the lacteals, lymphatics, and intestines, there are other organs which bear a similar part in this active effort for the general good, of which the kidneys are not the least important, and will be treated of hereafter. In order to understand more perfectly what has been said concerning the circulation of the blood, the connection the liver has with that process must be more closely observed. The veins of the alimentary canal and spleen or milt, are arranged differently from those of the external structure; they do not run immediately into those large vessels which originate in the heart, but assemble in one trunk, the vena porta (portal vein), which, after it enters the texture of the liver, branches off in the manner of an artery; and

from the lower end of these branches the blood is carried back to the larger vessels, by the veins of the liver. The blood, found in the vena porta, is darker, and contains more carbon than the other venous fluid, and it is possible that that portion which exhaled its vital principle during the circulatory journey, is able, through some elective affinity, to flow into the liver and aid in the secretion of the bile. The spleen, although its use is not clearly understood, is supposed to be the preparatory organ for the last-named process, but whether or not it subserves this purpose, it fulfills its own peculiar office in the purification of the blood.

The kidneys lie on each side of the vertebral column, plate 2, fig. 1, *D*, within the abdominal cavity, and in the lumbar region; these are two glandular organs, about the size of a small hand, and in shape resembling a bean. Each kidney has, internally, and on its concave side, a conduit by which its peculiar secretion is carried off. The lower ends of these vessels connect with the bladder, which lies in the lower cavity of the abdomen, and within the pelvis. Filled with nerves and blood, they are important agents in ridding the system of waste material.

From the foregoing it may be seen how, by the process of digestion, with the coöperation of the secretions of the stomach and liver, and aid of the mesenteric glands and lacteals, the nutritive portion is extracted from the crude element, and transformed into a milky juice, from which the blood is formed. This, too, has been described as constituting the life-giving principle by which every part of the body is regenerated: and, last of all, it is seen that, whilst a formative process is being carried on, another, not less important, is in operation, which sends

off the superfluous or refuse material; each having a peculiar set of organs, every one of which does its share of the work and in its own way.

#### THE NERVOUS SYSTEM.

Our next task is the consideration of the nervous system and the organs of the senses. In the foregoing pages we have shown how complex and various are the organs necessary in performing the animal functions. We have now to explain its connection with the nervous system, since all the impressions are made by it; for without the influence of the nerves, there would be no muscular action, no perception, no animal heat—in short, no life. The nervous system is the organ of the soul. Just as the various emotions and perceptions of the mind do not emanate from one internal central point, as, for instance, thought proceeds from the brain, and agreeable emotions from the heart, so the nervous system is not dependent on one great central organ. All the machinery, already described as belonging to the body, is controlled by the nervous power, and is consequently used by the mind. Many acts may be remembered, some of which perhaps exerted a mighty influence on the whole course of life, and which were rather the consequences of the heart's impulse than the decisions of the judgment. Memory, logic, mental sagacity, faculty of observation, and imagination proceed from the head; conscience has its seat in the heart, its voice comes from the interior of the body. As the nervous system, then, is the immediate messenger of the mind, it is plain it has no grand central organ, but is itself the organ of communication between the mind and body.

Let us study the nature of this system.

The nervous system is composed of white pulpy cords, converging towards each other, and most ingeniously arranged. The central organs of these are knots and filaments filled with a fatty substance, as the greater and lesser brain, spinal cord, ganglions of the neck, breast, and abdomen. Anatomists distinguish them as hard and soft, or nerves of sensation and nerves of emotion. The hard or spinal nerves spring from the brain and spinal marrow, and as soon as they leave the cerebral or vertebral cavities, they become inclosed in a cellular envelope; thus encased, they ramify to all parts of the body, according to their several offices. The soft or sympathetic nerves are those tender filaments which proceed from the ganglia, and are without any cellular sheath; the ganglia are a series of knots, filled with medullary matter, of small compass, but existing in great numbers. All the organs which receive the nerves from the cerebral or spinal nerves, as the organs of the senses, the members of the body or muscles of the trunk, have sensation and are capable of voluntary action. All those, however, which receive the ganglionic nerves, are not, in a healthy state, particularly sensitive, and are wanting in the power of muscular action; of this class are the intestines, lungs, liver, heart, stomach, spleen, etc. Whilst the heart, with impartial liberality distributes the perfected vital fluid to every organ in the frame, so, through the medium of the nerves, which go out from the brain, the great central workshop of the mind, the influence of the will makes itself felt in different parts of the body, and the phenomena of intelligence are manifested. The structure of the nervous system, the particular apparatus of the sensations, is very different from that of the agents of the circulatory process; for, while every organ of the



latter receives its supply from the nearest pulsating vein, the nerves often traverse a long circuit before they reach the organ which they are destined to serve. All parts of the body are not equally supplied with nerves, but, like the circulatory economy, which transmits a larger portion of nutritive matter to the more important organs, so the central power, viz., the brain of the nervous system sends out more and stronger nerves to those more important parts of the body, where their presence is most required. Thus, the heart, being constantly in action, has an extraordinary supply of nerves; so also has the never-wearying muscles of the eye, the organs of the senses, the stomach, etc., while the bones, cartilages, and ligaments have but few. It is said, too, that the nerves possess both a centripetal and centrifugal tendency; this at least refers to the cerebral and spinal nerves. There are, however, some peculiar nerves which communicate with the will—for instance, the nerves of voluntary motion, and nerves of sensation, which carry the impressions made by external things to the brain. So, by one set of nerves messages are received, and by another the mandates of the brain are sent out. The brain decides according to this leading—hence the deceptive impression made by a bullet placed between fingers laid over each other—the experimenter, imagining there are two instead of one; so, also, a man after having a foot amputated will, long after the operation, complain of having a pain in the toes. The difference between the nerves of motion and sensation is thus tested: If the motor nerves of the face are cut through, the muscle is disabled and can not act, because there is no longer communication with the mind; if the same happens to the nerves of sensation, there is no longer any feeling in the part. Nevertheless, the nervous filaments are only the acting

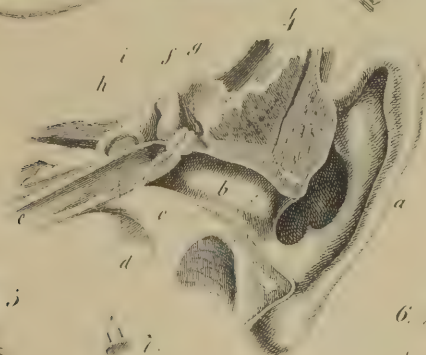
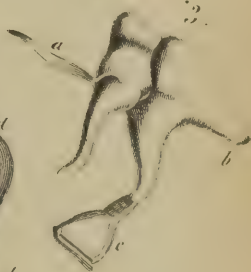
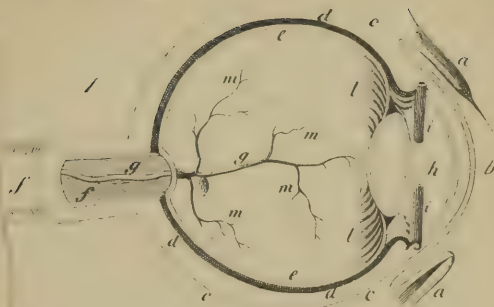
agents of the nervous system—the conducting wires by which messages are sent. If separated, they will heal after some time; should portions of them be removed, Nature will replace the injured part. The two terminations—the central and the periphrastric—are the main points. These, however, are not very clearly understood; for, at the central termination—the brain—the nerves lose themselves in the common medullary mass, and in the periphrastric they ramify into such minute filaments, that it is hard to discover where they end. The real active principle of the nervous system is the nervous spirit or volatile fluid, which is diffused everywhere by the nerves themselves, but is so extremely fine and subtle, as to elude all rude investigation.

Many indescribable sensations arise from this inexplicable nervous sensibility, as, for instance, there is often an intuitive feeling that some one is behind us, although we can not hear their footsteps; and there are many persons who will be aware of the presence of a cat in their room, although the animal may have so concealed itself as to escape observation. Thus have we barely touched on the general outline of the nervous system, as to enter into a more particular detail would far exceed the limits of this book.

## ORGANS OF THE SENSES.

STRUCTURE OF THE EYE AND EAR.—TOUCH.—SENSE OF TASTE.—OLFACTORY APPARATUS.

The organs of the senses are the mediums by which sensation or the perception of external objects is obtained. Their impressions bear the stamp of truth—but only the





external truth. The knowledge we acquire through their aid, we have in common with other animals, and the conclusions deduced from this experience are possessed by the inferior animals, but in a more imperfect degree. By means of the senses we learn not only what is going on around us, make and receive impressions, but can, through the knowledge thus obtained, find the key to internal truth. By this faculty, which is called reason, man is distinguished from the brute creation. The whole object of bestial life is accomplished when, by means of the organs of sense, all the animal wants can be satisfied; this, however, can not content the superior nature of man. The same organs—namely those of sense—are, in him, made to subserve higher purposes than those of mere animal enjoyment—they must lead him nearer to the spiritual life for which he is destined; the external truths presented through their medium fail to satisfy him, and he longs for something intellectual. The organs of the senses, being thus of greater importance to human beings, they are, in respect to corporeal structure, more perfectly developed than those of the brute creation.

*The Eye*, plate 5, fig. 1. The eye is a globe, composed of many membraneous coatings, of which only the outer segment is seen, the other being buried in the bony socket. The interior of this globe is filled with transparent or refracting mediums or humors, by which the faculty of sight is communicated. Six muscles, capable of moving in all directions, constitute its machinery; and by a soft, fatty cushion which surrounds it, together with the bony cell (the cavity of the eye in which it rests), and the protecting eyelid, *a*, with its fringed borders (eyelashes), it is ingeniously defended

from all outward injury. The eyelids, *a*, are folds of skin, enclosing the muscles by which they move, and on the border along the edge of each lid are little glands which secrete an oily substance; this, besides oiling the eyelashes, serves to keep the tears in the eye. The conjunctiva, a mucous membrane, is found in the inside, over which the tears, secreted by the lachrymal gland, lying in the orbital plate of the frontal bone, flow; they are carried by several small ducts which open near the internal angle of the eye. Here are found two small orifices (*puncta lachrymalia*)—tear ducts—which first imbibe and then convey the lachrymal fluid or tears into the lachrymal sac, which also communicates with the upper part of the nasal duct, which, in its turn, leads into the cavity of the nose. In consequence of any irritation to the eye, or mental emotion, a large quantity of tears will be secreted and flow down over the cheeks. The outer coat, which invests the ball of the eye, is a dense fibrous membrane, and is called the sclerotica. The larger and posterior portion invests four-fifths of the globe of the eye; it is opaque, and, on account of its brilliant whiteness, is called the white of the eye. The lesser and anterior segment is transparent and fitted into the bevelled border of the sclerotica like the crystal of a watch in its case; it is called the cornea, *b*. Under this opaque layer of the sclerotica, *c*, is another termed the choroid coat, *d*, a fine, vascular membrane of firm texture, and composed of a tissue of delicate blood vessels. It secretes upon its inner surface a dark substance called pigmentum nigrum, which is of great importance in the function of vision. Where there is an absence of this coloring matter, as is the case in albinoes, white mice, and rabbits, the choroid coat is, as it were, left



naked, and the exposed blood-vessels cause the pinkish hue so remarkable in the eyes of this class. The ciliary process, *l*, is a continuation of the choroid coat, *d*, formed of a number of triangular folds; the central border is free, and rests against the circumference of the crystalline lens. The retina, *e*, lies under the choroid coat, and is of exceedingly fine texture; it is composed of three layers—the external, the middle or nervous, and internal or vascular. The nervous membrane is the expansion of the optic nerve, *f*, which, situated in the posterior part of the pupil, and, piercing through the sclerotic and choroid coats, is the organ through which the sight is received. Between the anterior and posterior chambers of the eye we find a membranous curtain, provided with fine radiating fibers; in the middle of this is an opening called the pupil. This curtain, the circular fibers of which surround the pupil, and, according to the action of the light, dilate or contract it, is called the iris, *i*, and gives color to the eye—whether brown, blue, gray, or green. This is the uvea of the eye. The iris divides the eye into two unequal portions, of which the anterior chamber is smaller than the posterior. The anterior chamber, *h*, is filled with a clear fluid called the aqueous humor. In the posterior chamber, *j*, behind the iris or rainbow curtain lies, inclosed in a membranous capsule, the crystalline lens, *k*. This is a clear, shining, lentil-shaped body of different degrees of convexity; on the outer side it is flatter; on the inner it is concave, through which the rays of light which fall upon the eye are assembled. The remaining portion of the posterior chamber of the eye is filled with the vitreous humor, *m*; this is inclosed in a delicate membrane (hyaloid) which sends processes into the interior of the

globe of the eye, forming the cells in which the humor is retained. The central vein of the eye, *g*, passes directly through this portion, furnishing its nourishment with the colorless blood it carries. When the crystalline lens, or its capsule, is changed in structure, so that the rays of light can not pass to the retina, it is called a cataract; this, however, may be cured by the removal of the obstruction; but when the injury is to the optic nerve, it is called amaurosis, and does not admit of healing. The optical arrangement of the eye makes it necessary that all the images formed on the retina are pictured upside down. Every impression received by this objective projection will be accurate. As I, by touching an opening from above, know that my hand is below it, or from below, that it is above it; or, touching it on the right, I feel that the opening is on the left, or with the left, that it is on the right, so can the optic nerve only receive a true impression of surrounding objects from a reversed picture—like that of a camera obscura—being thrown upon the retina. The eyes are placed near each other, in certain orbits, by which means the faculty of sight is equalized. If one of the eye-balls is pressed back or sidewise in its orbit, or it is turned obliquely by the contraction of the muscle, as is the case in strabismus, objects will appear double. It happens, not unfrequently, that the vision of the eyes is unequal, and thus objects far off can be seen with one eye, while only those that are near can be distinguished by the other. The size of the object seen is reckoned according to the angle of the eye on which the rays of light fall directly; therefore, distant objects appear less than those that are near. It is possible, however, that the power of vision just mentioned is not original, but has been acquired by

practice. The child views an object as if it was painted on canvas, and will stretch forth his hand to grasp the moon or a tree as readily as it does the guiding finger of his mother, and will cry because she will not give him the stars for playthings. In order to secure a perfect vision, a certain time must be allowed for taking in an impression ; therefore, in a potter's wheel, which is divided into black and white panels, the difference of color diminishes or vanishes altogether, according to the rapidity with which the wheel is turned—the movement being very swift, the colors make no impression on the retina. The different colors have different times for their oscillations, and it requires practice of the eye in order to distinguish them accurately. The capacity of apprehension in this respect is very different, and in many is so feeble that they will mistake green for red or orange for blue.\*

If the lens or other parts of the eye are flatter than common, the rays of light will fall more feebly on the refracting power, and the eye be far-sighted. Persons possessing this sort of vision remedy the defect by the help of spectacles with convex glasses. An opposite

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\* Color is not inherent in bodies ; it depends upon the manner in which they decompose the light and the kind of luminous ray that the colored body can reflect. Each ordinary ray of light, though it appears colorless to us, is composed of seven different rays ; there is a very simple mode of being convinced of this fact : if we receive a bundle of luminous rays which have passed through a glass prism upon a sheet of paper, instead of producing a white image, it will form an oblong image, in which we distinguish the following seven colors, namely—red, orange, yellow, green, blue, indigo, violet. Now objects appear to us white when they reflect the light without decomposing it, and colored in this or that manner when they decompose it like the prism, and absorb some rays and reflect others.—ELEMENTS PHYS.—Tr.

defect to this is short-sightedness, and is in a great measure obviated by the use of concave glasses. This infirmity causes the eye often to be strained beyond the actual capacity of the optic nerve; therefore, for the better preservation of the sight, near-sighted people generally wear spectacles throughout the day. For weak and irritable eyes, colored glasses, such as blue or a smoky gray, which soften the intensity of the light, are the best. Every portion of the retina is susceptible to the impression of light, with the exception of the point of entrance. This can be explained by the following process. Place two colored wafers, which are stuck on paper at a distance of from an inch and a half to two inches from each other, shut one eye, and pass those wafers before the other which must be kept immovable; it will then be shown that one of the wafers will not be immediately seen or at the precise moment when the image of the other, striking upon the spot where the optic nerve enters the eye, makes an impression on the retina. This phenomenon, however, is not caused by any defect in the structure of the eye, and, therefore, is no hinderance to a perfect vision. More might be said on the subject of the beautiful construction of the human eye, but its further consideration will be better understood in the study of natural philosophy.

*The Ear*, plate 5, fig. 2, 7. The organ of hearing is placed deep within the cell of an irregular bony cavity, and is most ingeniously arranged. As a perfect colorless transparency of the inner portions of the eye is necessary for the reception of a true impression from the light, so is an almost adamantine hardness of the auricular organs which surround the radiations of the auditory nerve, indispensable for the right and speedy trans-

mission of the vibrations of sound. The external ear, formed of a cartilaginous substance in the shape of a shell, fig. 4, *a*, and which in man is but slightly movable, leads into the outer auditory passage (meatus auditorius), which, lined with numerous fine hairs, is also provided with small glands which secrete a bitterish, waxy, yellow substance, through which wise provision the inner portion of the ear is protected from the ingress of insects, or such particles as might enter were the passage unguarded. At the end of the outer passage (meatus auditorius), fig. 4, *b*, which forms a bony canal towards the interior, is the membrana tympani, or drum, *c*, which separates it from the middle ear, *c*. This membrane is very thin, and, stretched like a parchment over a drum, extends over the auditory passage, serves to facilitate the transmission of sounds from without, and also to moderate their intensity. Behind the membrana tympani is a cavity, *d*, of irregular form, to which is given the name of tympanum. Lying between the auditory canal, and the internal ear, it is filled with air which gets there through a canal called the eustachian tube, *e*, which opens in the superior part of the pharynx, and is clothed with a mucous membrane. Hearing may be impaired by the obstruction of the eustachian tube. The deafness and explosive sounds experienced during the presence of a catarrh (cold in the head), is produced by this obstruction, and it may have been observed that persons who are hard of hearing are often in the habit of opening their mouths in order to hear more readily. There are three little bones which are found in communication with the membrana tympani, *c*; they are designated as the malleus (hammer), *f*, the incus (anvil), *g*, and stapes (stirrup-bone), *h*. These three bones of hearing, the hammer,

in fig. 5, anvil, fig. 6, and stirrup, fig. 7, are represented of their natural size, and also in their articulatory union in fig. 3, hammer, *a*, anvil, *b*, and stirrup, *c*.<sup>\*</sup> They have the property of expanding or contracting the membrana tympani as occasion may demand, and of conducting the vibration of sound to the bony labyrinth, fig. 2. They are spoken of as a chain of bones, as they act in concert, and are set in motion by a peculiar set of small muscles. The hammer, *a*, rests upon or stretches across the membrana tympani; the anvil, *b*, forms the communicating joint; the stirrup, *c*, however, stands with his footstep in close neighborhood with the oval cavity, which is closed with a membranous curtain, and leads into the outer court or vestibule of the labyrinth. These footsteps of the stirrup-bone, as they are pressed more deeply or lightly on the second drum that is over the opening to the winding passage, causes a shaking motion. These passages are filled with fluid, and the vibration of the drum over the opening, makes this fluid to vibrate or shake. Besides this opening in the labyrinth, there is another which leads into the internal ear; this is the round cavity, *f* (foramen rotundum), which, situated a little lower down, opens into the tympanum, and is closed by a membrane which is called the second membrana tympani. The labyrinth itself is a bony cavity, consisting of three winding passages, the semi-circular canals, *d*, and the cochlea, so called from its snail-like shape. In the inside of the cochlea is a passage (membranous labyrinth) leading to the brain, through which the auditory nerve enters. The delicate branches of the

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<sup>\*</sup> The os orbiculare, or lenticular bone, is at present named as a fourth bone of the ear. It is the smallest bone in the body.—ELEM. PHYS.—*Tr.*



latter, with the cochlea and semicircular canals, fill up the labyrinth, and are surrounded by fine membranous sacs which are filled with fluid.

The manner in which the function of hearing is performed is as follows. The vibrations of sound which enter the ear, strike upon the membrana tympana; these vibrations are passed along the chain of bones to the labyrinth; most probably the tension or relaxation of the membrane is regulated by the same. The vibrations of the air awaken corresponding oscillations in the fluids of the labyrinth, and the nervous fibers scattered through this fluid, feel the vibration, and awaken the auditory nerve to a right impression. As in the faculty of seeing, a certain limit obtains, as regards distance or color, beyond which there is no distinguishing point, so also the ear can not discern any difference between a tone in a sound which has but thirty-two vibrations in a second (as is the case in a thirty-two feet organ-pipe), and one which has sixty-four thousand. What the precise functions of the cochlea and semicircular canals are, it is hard exactly to decide. It is, however, possible that the last-named serve simply for the transmission of sound, whilst the former acts more in the character of an arbiter of its quality or musical worth. The function of the second membrana tympani, is, perhaps, to repeat or echo lightly the impressions of sound by which the nerve is better enabled to distinguish its peculiar properties, than by a stronger tone. We use the term, echo lightly because this membrane is not an indispensable appendage to the bony, winding passages, which, after all, are the essential part of the apparatus of hearing. A part, or the whole of the membrana tympani may be destroyed without actual deafness being produced. Even injury

to the hammer and anvil will not effectually cause a total loss of hearing, but if the stirrup-bone, or parts of the membranous labyrinth are injured, so that the fluids contained in the passages escape, the auditory nerve dries up, and total deafness ensues.

*The sense of Smelling.* The nose is the organ of smell, and in the brute creation is of double importance, as it not only guides them in their selection of food, but is a powerful agent in their well-known instinctive sagacity. But if in man, this faculty, namely, instinctive sagacity is inferior to that of the brutes, he has an intellectual sense, of which the nose is a representative, but only as far as this is concerned. The sense of smell, like that of taste, may be improved by cultivation, and is somewhat under the control of the will, as, for instance, the power of receiving or rejecting odors that are presented; thus, those possessing an agreeable fragrance are inspired forcibly; if they are offensive, our inspirations are more cautious, or we close our nostrils.

The borders of the nasal cavity against the cavity of the skull, forms a sieve-like perforated bony plate—the sieve-bone—on which many little cells, the labyrinth of the sieve-bone, are fastened. Through the apertures of this sieve-bone arise many fine fibrous threads; these are the olfactory nerves—plate 3, fig. 1, *k*, that ramify, web-like, upon the mucous membrane which lines the nasal labyrinth. These are the agents of the sense of smelling, and it is by them that the scent of anything is discerned. The impressions of odor are most sensibly perceived during inspiration, because the olfactory nerve is more affected by the inhalation of the air, than when it is respired. Through inflammation of the mucous membrane, and chronic catarrh, this sense may

be altogether lost. From the perceptive sensibility of the olfactory organs in man, it may easily be conceived that a watery fluid which contains less than  $\frac{1}{2000}$  of its own weight of spirit of fresh musk, will retain the odor for weeks, and even when the solution, made weaker by adding water, is brought down to  $\frac{1}{20000}$ , by the shaking or warming of the solution, the odor of the musk is still perceptible.

*The sense of Taste.* The organs of tasting are the tongue and hard palate. The tongue, plate 2, fig. 2, possesses three varieties of papilla, which are made up of a network of fine blood-vessels and delicate nervous fibres; the larger papilla (pungiform) are situated at the base of the tongue, *b*; the lenticular, on the upper surface, *c*, and beside these, at the end and on the border are the bullet-shaped filiform, *d*, which are the least of all. Sweet, sour, and salt substances seem most to impress the two latter; the bitter and pungent are more readily taken up by the first; hence the distinction between the first and after-taste, as it is called. The impression made by taste is thus caused. The food carried into the mouth is pressed by the tongue against the hard palate, and receives essential aid from the olfactory organs. Therefore, persons who have lost the sense of smelling, have no acute perception of tasting. The sensibility of the organs of taste, although not quite equal to that of the olfactory structure, is, however, sufficiently acute, as may be supposed when we tell our readers that the bitter taste of quinine is detected in water which contains in solution  $\frac{1}{3000}$  part of the same. Animals, by taste and smell, distinguish what is proper for food, and are guided by them in the selection of the nutritious article, as well as being warned against the noxious. The above remarks

are intended only to apply to the sensual and corporeal pleasure derived by human beings from the use of food ; in another place the difference in intellectual tastes has been already discussed.

*The sense of Touch.* The sense of touch or feeling which is extended over the whole body, and serves to warn against external injury, is barely that sense which reveals to us the contact of foreign bodies with our organs, and enables us to determine the nature of their surfaces, temperature, or consistence, and, to a certain extent, their form, volume, and weight. The true tact or touch, however, has more sensibility ; it is spread out in all parts of the surface of the body, and resides in the skin. The hand of man, but especially the fingers, constitute the special organ of touch ; and its structure is admirably well adapted to its exercise. In most others of the mammalia it is found in the hair, beard, horns, or upper lip. The finger ends are furnished with a soft cushion of subcutaneous fat, of great sensibility ; the nails protect them from injury, as well as give them firmness and security, in their contact with external bodies. The active sense of perception found in the extremities, which is of so much importance in the ordinary intercourse of life, is called tact, and its functions are different from those simply designated as the organs of touch. And now, at the close of our representation of the physiological structure of man, we beg our readers to study the accompanying plates to which we have regularly referred them, so that they may have a perfect understanding of the beautiful organism of the human frame, which we have tried to describe.







## SECOND ORDER.

## QUADRUMANA, OR FOUR-HANDED.

## APES.

It is an undeniable truth, that this class of animals resembles man as closely in physical structure, as he differs from them in respect to intellectual qualities. That is, if specimens of the lowest and most degraded found in the ranks of human nature are not presented as characteristics of this resemblance. There have at all times been representations of beings resembling the human race in outward conformation, yet still not exactly men. The fable of the Troglodytes, a pigmy race, who, according to the legend, dwelt in caves, and lived on wild fruit and nuts, has, no doubt, arisen from this belief, and the natives of Borneo still insist that the Orang-Outang is indeed a man who will not speak lest he should be made to work.

However naturalists may have speculated on the degrees of affinity between man and animals, and whatever comparisons in regard to physical structure they may have been pleased to institute, the following characteristics are sufficiently distinct to set aside all claim of relationship supposed to exist between the monkey race and the family of man. In apes the forehead is retreating, the mouth protruding, and the lips without fullness; the haunches are so small that they are incapable of sustaining the body for any length of time in an upright position; the knees can not be firmly stretched, as in men, for they are without the muscular support given by the calf of the leg. The toes are arranged like the fingers on the human hand; the great toe (answering to the

thumb) is set backwards and opposable to the others; hence arises the name given by naturalists to the whole species, *quadrumana* or four-handed. Another and more important distinction exists between man and the ape, in the perfection of the vocal apparatus in the former. Man is the only animal that can articulate sounds, or convey his ideas by words. The want of speech is not only caused by a less perfect organization of the vocal organs, but by a natural incapacity for their use. Therefore the ape can not be so tamed as to be made susceptible of such training and improvement as that he shall become fitted to form a link in the great human chain, nor has he capacity for being trained to habits of intimacy with man; his indwelling instinct is prompted only by externals, and hinders him from intellectual development.

By the aid of his four hands, the ape is a more dexterous climber than any other animal. His dwelling is in large trees, through whose foliage he moves with the most vigorous activity. Springing from branch to branch, he visits other trees than his own in order to pluck the fruits, which he either devours with great gluttony, or else bites and throws away. The apes will play with each other, sometimes in the most tricky manner, making grimaces, as if in mockery, or pelt each other with fruit or branches of trees; and, having discovered that one is possessed of better fruit than themselves, they will pursue him with loud cries, and, after they have deprived the owner of his store, partly by violence and partly by fraud, they will set up a ludicrous screaming, which seems like a mocking laugh. We say seems, for, like all other animals, they fail in this capacity, man being the only creature that can laugh.

The apes are found only in the southern portions of the two continents; there are none in Europe (with the exception of Gibraltar), but they are a numerous race in Asia, Africa, and America. Their food consists of fruit, insects, eggs, and, rarely, of small birds. Their teeth are arranged like those of man, with the exception that, in some species, the canine teeth protrude strongly over the others. Naturalists commonly divide the apes into three large families :

I. THE TRUE APE. These are known as:

1. Apes of the old world.
2. Apes of the new world.

II. UISTITIS. Small squirrel-like apes. Found in South America.

III. MAKIS. Distinguished by their slender figure and fox-like faces.

#### I.—THE TRUE APE. $\frac{4}{4}$ , $\frac{2}{2}$ , $\frac{1}{1} \frac{0}{0}$ .

This class more resembles man in reference to bodily conformation than any other, and much has been related by travelers, of their imitative power; but a closer survey will show that the ape could never be taught the movements of a human being, and that only in respect to bodily structure is there any likeness. All narratives of monkeys imitating the actions of men are, therefore, either bare fiction or the result of faulty observation. These animals live in companies in forests, or among rocks, and, by means of a staff, can maintain an upright position. The female ape is peculiarly fond of her young, so much so that she nearly squeezes it to death in her affectionate embracings. They can be tamed, but it is only by hard training, and many that have been broken into submission, remain as mischievous as in a native state. Warmth is indispensable to their existence, therefore they never live long in cold climates. This

species of apes is divided into two classes, namely, tailed and untailed, and such as have pouches on their cheeks and ischious callosities. We will describe these generic peculiarities more fully as we proceed. Their pouches are composed of folds of skin seated inside the cheeks, and serve as pockets in which the animal stows away the fruit and other food he gathers, until it is convenient for him to devour it. The ischiatic callosities on the posteriors, differ according to the species in form and size, and afford material aid in the daily life of the animal, as he sits in the branches, or glides from the trees.

#### THE ORANG-OUTANG.

The natural history of this class is still veiled in much darkness. Old travelers have brought us accounts of apes resembling large men; later observers have denied the truth of this statement, and insist that the orang-outang never exceeds three or four feet in height. The latest testimony, however—and most probably the true one—substantiates the fact that the orang-outang is very large, often five or six feet in height. These animals are rare and inhabit the impenetrable forests of Borneo, Java, and Sumatra, as well as those of Guinea and Congo. As there are few in those countries who care to study the peculiar habits of these creatures, we are obliged to limit our observations to those specimens which have been tamed when young, and brought to Europe. There are two species of orang—the Jocko or Chimpanzee, and the Pongo or true orang-outang.

The *Jocko* (*simia troglodytes*), plate 6, fig. 3, is of a dark brown color; its whole body, with the exception of

the visage and hands, which are bare and of a dark flesh color, is covered with short, thick hair.

The *Pongo* (*simia satyrus*), on the contrary, is of a reddish brown, with bare hands and face of a brownish hue, and the only essential difference between him and the Jocko is, that in the *Pongo* the nail is wanting on the great toe. Beside the already mentioned characteristics, both of these species differ greatly from the human animal in the disproportionate length of their arms. According to the statements of old naturalists, the orang-outang builds himself a hut in the forest, by bending the flexible branches of the trees and skillfully interlacing them. He is the only ape which uses sticks and stones as means of defense, and has some idea of artificial weapons; in this he differs from all other animals. It is said by travelers that the orang-outang will go in companies and attack the elephant, which they beat with sticks and stones, and seldom fail to drive him off from that part of the forest they have appropriated for themselves. When tamed, the orang-outang walks upright as men do, and in this posture he can carry a considerable burden. But he is of a melancholy nature, and sits demurely in a corner. His movements are not active, like those of other monkeys, neither is he merry; but he walks about gravely and with a measured pace; nevertheless he is not stupid, but understands the signs and words of those whom he knows. As he is very sensitive to cold, he soon gets accustomed to wear clothing with the exception of shoes, to the restraint of which he submits very unwillingly, because they hinder him in walking. As his natural instinct enables him to imitate whatever he sees done by human beings, he is taught to perform many useful offices, and even to do the work of

a servant. He can not, however, be depended on, as having no steadiness of purpose, as soon as something novel presents itself for imitation, he forsakes whatever he has been engaged in, and begins with the new. If, for instance, he is sent to the neighboring spring for water—as he often is—he will fill the pitcher as systematically as may be, but should he, on his way back, meet a boy trundling a hoop, he will most certainly let his pitcher fall, and stand gaping at the sport. The orang-outang is not ungentle and is fond of playing, particularly with children; and should he show any petulance while thus engaged, a gentle admonition from his master is sufficient to restore his good humor. If, however, it is deemed necessary to punish him, he will creep into his cage or prison, hold his hands before his face, and howl as if greatly afflicted. In sitting, his favorite posture is like that of the Turks—cross-legged—and when accustomed to take his meals at a table, he eats like a human being, and is fond of dainties, preferring confectionary to everything else. If anything set before him does not suit his taste, he can help himself in a way of his own. A plate of salad, for instance, was set before an orang-outang; he tasted it and found it was sour; this was not agreeable to his palate—he, therefore, took the leaves and rubbed them on his arm, in order to get rid of the vinegar; but not being able to succeed in this way, he threw the whole into a napkin, and pressed the acid out.

When properly tamed, he is trained to practice all the external customs of men, and soon learns to behave himself very naturally. On the entrance of a person he knows he will take his hat, hold out his hand to have it shaken, walk up and down the room with his guest, and



moves his lips as if he would speak with him. At meals he handles his knife and fork quite dexterously, uses a napkin and spoon as he sees others do, pours out wine or tea quite naturally, and sweetens all his drinks with plenty of sugar; most commonly, however, he performs all these acts at the instigation of his master, but very often also of his own accord. He regards strangers with an expression of respect and timidity rather than fear, but approaches those whom he knows unhesitatingly, in order to receive their caresses. Sweetmeats and ripe fruit are his most favorite articles of food. An orang-outang, who died in London a few years ago, having remarked, during his sickness, that the physician, when he came, always felt his pulse at the wrist, when any one afterwards came to visit him, he would put on a dolorous look, and never failed to stretch out his hand to have his pulse felt. These animals are very dexterous climbers, and having gained the bough of a tree, do not suffer themselves to be easily taken. If the huntsman is adventurous enough to climb up after one, he knows how to baffle his labor by shaking the tree so violently as to dislodge his enemy and stop the pursuit.

In their native country these animals are very strong, and the natives fear to be attacked by them, as they believe and insist that it requires the force of six men to contend, successfully, with a full-grown, active orang-outang. They sometimes carry off negro children, and keep them in the forest, feeding them well. A negro boy, who lived among these animals for a long time, declared that they had never caused him any suffering, but treated him kindly, never, however, permitting him to leave the forest or to go to any distance from them. The negroes, therefore, are much afraid of them, believ-

ing them to be an outlandish people, who have settled in their country to rob them of their relatives, and use them as slaves.\*

THE LONG-ARMED APE.—*Gibbons (Hilobates)*.

The *Gibbon*, in respect to the shape of his head, much resembles the orang-outang, but has such extremely long arms, that he always keeps an erect posture even when walking on all fours—these arms being as long as body and legs together. He has no tail nor pouches in the cheeks; the ischiatic callosities are, however, present. With the exception of the long arms he bears as great a likeness to man as the orang-outang. His posture is upright, although he mostly goes on all fours. There are different species of this ape; those best known are the black gibbon (*simia lar*), plate 6, fig. 2. His body is covered with coarse black hair, with the exception of his hands, ears, and face, which are naked; the last, however, is surrounded by a circle of gray, bushy hair, like a beard. He is from three to four feet in height. The brown gibbon (*simia agilis*) is small and of a brown color, except in the face and along the back, which are yellowish. He is lively, uncommonly active, and, on account of his peculiar cry, is called the Wau-Wau.

This ape is very docile and of gentle disposition, al-

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\* Gerat tells us of a female ape he saw at Java. She was very tall, and often walked erect on her hind feet. She made her bed very neatly every day, lay upon her side, and covered herself with the bed-clothes. When her head ached, she bound it up with her handkerchief, and it was amusing to see her thus hooded in bed. M. de la Brasse relates many interesting accounts of the baris (orang-outang) of Sierra Leone, where they are taken in snares, and educated to serve for many domestic purposes.—*Tr.*

though its movements are so sudden and violent that they may readily be mistaken for manifestations of anger or a ready attack. He is very averse to cold or damp weather, and being a native of Coromandel, Malacca, and the Moluccas, can not live long in a northern climate. His food consists of fruit, sugar, and other sweet things, but he always refuses meat. When captured, he shows himself confident, inquisitive, and dainty; but he is almost incapable of being trained, and by no means as sagacious as the orang-outang.

THE GUENONS.—(*Cercopithecus*).

The *Guenons* are apes with tails, whose mouths are less protruding than those of other apes, and they have both cheek pouches and callosities. There are very many species of this race inhabiting the forests of Africa, where they live in troops, and often sally forth to commit their depredations on the neighboring orchards and gardens, where they make great havoc. The most remarkable are—first, the *Callitrix* (*simia sabaca*), which is about two feet in length, with a tail as long as its whole body. It is of a fine olive-green color on the back, on the lower surface white; the visage is black with some yellow hairs on the cheeks and end of the tail. It is found along the whole western coast of Africa, from Senegal to Caffraria, and is one of the apes most frequently seen in an itinerant menagerie, as it can bear the changes of a northern climate better than any others of the race. It is a sagacious but ill-tempered animal, and when irritated will contend fiercely; nevertheless it suffers itself to be caressed by its acquaintances, and shows its satisfaction by purring like a cat. In their

native state, this tribe is peculiarly cunning; when they see a hunter approaching, they thrust their black faces from behind the branches as if in mockery, but as he comes nearer, all vanish, so that not a single monkey can be seen on the tree; for, keeping very quiet, they crouch down on the limbs among the foliage, in which, assisted by their green coats, they are effectually screened. If one of the troop is shot, the others remain silent as at first until the enemy comes near; then, as they scamper off, they try to scare him away by loud screamings, frightful grimaces, and grinnings, at the same time pelting him with stones and dirt, as they escape to another tree.

The sooty *Mangabey* (*simia fuliginosa*) is of a chocolate-brown on the back, pale yellow underneath, with white eyelids, and in length one foot and a half. He is very gay and frolicsome, playing the most ludicrous antics, and making ridiculous grimaces, during which his large teeth are fully displayed. He scratches his head or side with a very wise look, and has a peculiar air of drollery which renders him very amusing. Altogether docile, he can be taught to dance on a rope, ride on a dog's back, or turn over the leaves of a book. There is one variety of this class which is distinguished by a circle of white hair round the neck. Africa is its native place.

The *Nun ape* (*simia mona*) is of the same size of the former, with a tail two feet in length. The whole body is brown, the limbs black, the inner side of the arm, the breast and crown of the head whitish; a black stripe runs across the forehead; the nose is flesh-colored. He is one of the handsomest apes which come to us from Africa, and bears the changes of our climate well. Of a

sociable nature, he soon becomes accustomed to the companionship of men, is very spirited in his movements, but passionate if his wishes are not gratified. A great thief, he can pick a pocket with great dexterity, inserting his small pointed fingers so lightly as not to be observed. He can make a knot quite skillfully, and when he can succeed in stealing the key of the lock on his chain, has no trouble to open the padlock. For the rest, he is quiet and serious, never making grimaces, although willing to play with those whom he knows; when pleased, he utters soft low sounds expressive of his satisfaction; he accommodates himself to every situation, and never bites fiercely. The mona eats every thing that is offered, fruits, bread, cooked meats, and insects, such as spiders, ants, and others of the same class.

The *Long-nosed ape* (*simia rostrata*) belongs also to this family. His color is yellow, striped with red and gray on the arms and around the neck. His distinguishing mark is, however, a long pointed nose, in shape much resembling that of a human being, which gives him a most comical appearance, especially as his face, which is naked and of a brown hue, is adorned with bushy whiskers, and a strong beard. This species is found in Borneo, and lives in large companies, forming a regular community. Large groups assemble in the morning and evening, in the trees which overhang the banks of rivers, where they chatter and scream as though they were discussing some political question. Their cries, which sound like "kahau," and are incessant, are not only disagreeable, but actually terrifying to the traveler.

The *Macaque*. The animals belonging to this race possess all the characteristics of the above-mentioned

species, such as the cheek-pouches, tail, etc. Their limbs are stouter and shorter, and the iris of the eye is more strongly developed. The handsomest of this species is the *Bonneted monkey* (*simia sinica*). His color is brown, but on the upper part of the head is a portion of white, which, diverging raylike towards an imaginary circumference, fashions a sort of bonnet like that worn by the Chinese. The face is flesh-colored, and the under surface of the body whitish. Its length is one foot and a half. From his flesh colored visage, the white cap which projects from his high and well-formed forehead, lively brown eyes, and human-shaped ears, the bonnet-ape looks like a little old man; he is very teachable, and imitates every thing he sees; turns summer-sets, smokes segars, dances on a rope, and walks with a cane. Fruit and yellow turnips are his usual articles of food, but he devours canary and hemp-seed greedily, as great dainties. He comes from Bengal.

Another species of this kind is the *Wandernu* (*simia leonina*). The body is black. His head is covered with a bushy wig of white hair; a thick beard of the same color surrounds his face. These, meeting, form a cap, from whence his name. He is of a ferocious disposition, and, like the above-mentioned, is found in Ceylon. The monkeys of this class are remarkable for their voracity and the rapacity with which they plunder the fields and plantations.

The species best known is the *Java baboon* (*simia cynomologus*). This baboon is a foot and a half in length; the back is of a greenish brown, the under surface of the body and feet blue gray; the face nearly naked and gray, but between the eyes rather white; hands and ears black, likewise a naked, loose, rat-like tail,



which the keepers of menageries mostly cut off, as it is so disfiguring to the animal. There is another smaller species which is more common than the above-mentioned; this class of monkey is, instead of the greenish-brown hue, altogether of a light gray color, and in size never exceeds a half-grown cat. They are droll little creatures, skipping about everywhere, and when left free to roam, perform numberless amusing tricks. Nevertheless they are very irritable, and when teased revenge themselves by acting in a very unbecoming manner, making horrible faces, etc., to show their displeasure. Among themselves they are sociable and fond of each other, and when deprived of companionship with their own race, will attach themselves to dogs. They understand the countenances of those who approach them, and become very angry if any one looks askance at them. They are, however, not to be trusted, even when considered well trained.

#### SHORT-TAILED APES.—(*Magots*.)

The genuine *Turkish ape* (*simia innuus*) is the only one of this genera found in Europe. He inhabits the northern border of Africa, and the rocks of Gibraltar, and, instead of a tail, has only a short stump, rather to indicate such an appendage, than to prove it. His whole body is covered with brownish gray hair, and instead of walking erect, like other monkeys, prefers going on all fours; although his movements are awkward, his frame unwieldy, and he walks badly, he is, nevertheless, a very expert climber. In his native forest he is shy, apprehensive and cautious, so that it is a difficult matter to capture him; if taken when old, he is sullen and fero-

cious, sits with his arms hanging listlessly down beside him, looking neither to the right nor left, only moving when food is brought him, and, not able to bear the loss of liberty, soon dies. But if trained whilst young, he exhibits great docility, understands the words and signs of his master, and readily imitates the actions of men. Thus he is often taught to dance on a rope, leap over bars, trundle a hoop, ride on a dog, and perform all kinds of mountebank feats on an even floor, keeping time to the strokes on a drum. He will eat every thing offered him, except raw meat, cheese, or other things of a fermentative nature, but his most common food is bread, vegetables, potatoes, and fruit of different kinds. When offended, he grins and moves his teeth with extraordinary rapidity, utters loud and hoarse cries, and tries his best to bite and scratch his tormentor. It is with difficulty he can walk erect, and he can not maintain this posture for any length of time without the aid of a staff. He is of a very sociable nature, so that he is not only familiar with animals of his own species, but will form companionship with others belonging to the larger races, such as camels, bears, dogs, etc., riding on their backs most unhesitatingly. He is fond of Guinea-pigs and rabbits, carrying them about, patronizingly caressing, or feeding them. He will eat vermin of any kind, and is in height about two and a half feet. This class of apes includes

THE PAVIAN OR DOG-HEADED MONKEY.—(*Cynocephalus*)\*

These apes have, like most of the monkeys of the Old

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\* Those animals of the monkey tribes which have no tails are termed apes; those with short tails, baboons; the most numerous division have long tails, and are called monkeys.—BUFF.—*Tr.*

World, pouches on their cheeks, ischiatic callosities, and tails of various lengths. They are, however, distinguished by an extraordinary length of muzzle, which causes them to resemble dogs rather than apes. This protruding muzzle, like that of the canine race, terminates in an abrupt angle, so that the nose and mouth are in a direct line with each other. The most remarkable of this class is the *common Pavian* (*simia sphinx*), plate 6, fig. 4. His thick coat of hair is of a yellowish brown, his cheeks are surrounded with a yellow beard, his face is black, and he has a short tail. In size he attains to two and a half feet, and is often seen in the itinerant menageries which travel everywhere. He is very vicious, shamelessly impudent, and of violent temper, which he manifests by shaking the bars of his cage, and exhibiting his teeth if any one goes near. He eats everything, but shows a preference for fruit and raw eggs, and if spirituous liquors are set before him, he will drink to excess.

The *Chaema* or *Black Pavian* (*simia porcaria*), is a variety of the baboon family, and in the face resembles a pig. His color is a dusky olive, bordering on black, the hair on his cheeks gray, face and hands black, and on the end of his tail is a tuft like a tassel. He is a native of the Cape of Good Hope. Living in tribes, and always ready to plunder, this race of monkeys always assemble in troops and commit fearful devastation in the vineyards and gardens. With a sagacity almost human, they will station a guard on the outposts to watch if any intruder approaches. Their plans being arranged, they proceed to action, proceeding as follows: a part of the company enters the inclosure, climbs the trees, and tearing off the fruit, throws it down to those standing below. These

hand it to others, who form a line reaching to the rendezvous without, which is generally in some craggy mountain, and thus, all assisting in the work, the booty is soon safely disposed of. As soon as the sentinel sees some one approaching, he gives the alarm by uttering a loud cry; in a moment the plunderers all scamper off; if he neglects to warn in time, the whole party will fall upon him and beat him almost to death. Their claws and teeth are so sharp that they can inflict very severe wounds. When they are chased they sigh pitiously, and when overtaken, manifest much emotion, and groan and cry like human beings. If captured when very young, they can be nurtured on goat's milk, and trained to perform the offices of dogs; but they never become familiar with men, and always remain mischievous animals. When fully grown they attain the height of three and a half feet.

#### THE MANDRILL.

This class closely resembles the pavian; has ischiatic callosities and cheek pouches, differing only by having a much longer muzzle, and a shorter tail. Savage and ferocious, these animals can not be subdued either by kindness or harshness, but remain untamed. Those best known are the *Coras* or *Mandrill* (*simia maimon*), plate 6, fig. 8. The hair on their bodies is of a greenish brown, on the back, olive green; the beard on the chin and jaws is of a citron yellow; the cheeks are deeply furrowed and blue; in the male, the broad extremity of the muzzle and the hinder part of the body, are of a fiery red color. He is nearly as large as a man, and both in appearance and nature is a most disgusting and ferocious

creature. The only good quality he is said to possess is cleanliness, for whenever he comes to a stream of water he is sure to wash his face and hands. His unconquerable savageness and brutality are without bounds, and when he is angry he shakes the iron bars of his cage, and shows his long canine teeth. With a stick in his hand, he can walk tolerably erect. This, however, is not a favorite posture. When imprisoned, he sits quietly, looking around with a disturbed and sullen expression. The usual food of this animal is fruit and nuts, but he will eat eggs, or meat that has been cooked. In spite of his savage obstinacy he can be trained to perform some mountebank exercises, though these forced gambols are rather awkward than graceful. He will drink wine and brandy very willingly, and when pleased grunts like a hog. Guinea is its native place, where, on account of its brutal propensities as well as its depredations on the fields, it is an object of perpetual dread to the negroes.

#### THE APES OF THE NEW WORLD. $\frac{4}{1}, \frac{2}{2}, \frac{1}{1\frac{1}{2}}.$

The monkeys of the New World are distinguishable from those of the Old by being less savage and untamable than most of those already named, as well as being without callosities or cheek-pouches. They all have a very long tail, which serves them as a balance-pole, and some possess the power of wrapping the tail, which is prehensile, round objects, thus making it serve as a fifth hand. The bones of the eyebrows are not developed, as in the first-mentioned race of apes; the head is more arched, and the nostrils, instead of opening from above to below, extend horizontally. Their character, upon

the whole, is timid, quiet, and melancholy, and if they sometimes become unmanageable and bite, it is less owing to an outburst of natural fierceness, than because they are frightened out of their usual sedateness, which they can not bear to have interrupted. The first of these is called

THE HOWLING MONKEY.—(*Stentor*.)\*

These apes are remarkable from the frightful tones they send forth by the instrumentality of a singular bony process connected with the larynx, and serving as a resounding-board; it consists of a pouch close to the neck, into which the air passing causes a swelling, which gives them an appearance of being scrofulous. They have a long prehensile tail, which, used as a fifth hand, serves them for grasping or rather holding on to the branches, as they swing themselves from them, and is bare at the extremity. They are very numerous in the primitive forests of South America, where they live in companies. Sullen and indolent, they may be seen lying motionless, basking in the sun, or sleeping throughout the day; but at night they are aroused to activity. About the time of the flood-tide, they assemble in the woods, and begin their frightful concert. One of the troop—the leader perhaps—gives the signal, a kind of preparatory hem, such as some public speakers preface an oration with. This being repeated, he begins his discourse in a voice so hoarse and loud, that from a distance it might be supposed all were roaring together. It is not, however, until he makes another signal that the rest join in; nevertheless, when they begin, the chorus, echoed

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\* *Warina* and *Alouata*.—*Tr.*



through the vast forest, is perfectly terrific, and this singular noise can be heard many miles. A company of soldiers belonging to a garrison at Surinam, having been sent out at night to reconnoiter, landed in a creek in the neighborhood of a forest where these animals were holding their nocturnal assembly. Hearing the terrible noise, they became alarmed and retreated to their post, carrying with them the startling news that a formidable enemy was approaching. The next day, however, proved that the supposed foe was only a troop of Howling Monkeys. They are very sad when imprisoned, show themselves ill-natured, and will bite severely if any one approaches them too closely. As they grow old, they gradually lose their voices, and become altogether silent. Very few of the Howlers are ever carried abroad, as they can not live in any climate but their own. Their flesh is prized as being very delicate and palatable. The best representative of this class is the *Red Howler* (*simia siniculus*), which is found mostly in Guiana and Surinam, is about the size of a fox, and of a reddish brown color. Its head and tail are of a chestnut hue, and it lives entirely on fruits.

#### THE SPIDER MONKEY.—(*Ateles*.)\*

These monkeys are distinguished by having the thumb, found on the anterior extremities of other apes, either entirely undeveloped or else buried under the skin. The tail, prehensile and well-formed, serves the animal as a fifth hand more fully than those of other monkeys. The most remarkable of this class is the *Coati* (*simia*

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\* Sapajou. Americc.

paniscus), plate 6, fig. 7. It has but four fingers and no thumb on the fore paws; its face is flesh-colored, its coat rough and hairy—is about two feet in length with a tail longer than its body. This appendage is of infinite use in all the movements of the animal; by it, more than the hands, it collects its food, and grasps objects in the most dexterous manner; for, wrapping the end of it on the branch of a tree, the coati swings himself slowly backward and forward at pleasure. Their gait in walking is bad and unsteady, for, as they place their feet, or rather hands, upon the ground, they set the anterior extremities on the inner side and the posterior on the outer, and when forced to walk, always endeavor to make use of their tails. They are of a melancholy demeanor, but are gentle and easily tamed. Many naturalists have declared that the coati tribe will assail an enemy with sticks, stones, filth, etc. This, however, is not true, for their love of ease is unlimited. They are so lazy that when one is tamed, it is entirely passive, making no resistance to whatever kind of treatment it receives; indeed, a traveler, who had caught one covered it up, even its face, in the sand, but the phlegmatic animal, lying quite still, never once attempted to stir from the position in which it was placed. Its activity and dexterity in climbing is, nevertheless, very great, and is plainly exhibited when pursued. The prehensile tail never loses its hold, but even when killed by being shot, the poor creature remains so firmly suspended by this singular appendage, that it is not unfrequently a hard matter to secure the dead body. His cry is a shrill but mournful wailing note of Oh! Oh! Oh! The flesh is very palatable, and esteemed as game by the huntsmen. Fruit forms the chief article of food for the coati;

he, however, greatly prefers paradise figs (bananas) to everything else.

THE SAJOU OR SAGOUINS.—(*Cebus*.)

The *Sagouins* differ from the Sapajous by the presence of a thumb on the extremities, and the prehensile tail being covered with hair. The head is round, and therefore gives to the animal more of a human appearance. There are several species belonging to this class. The *Capuchin ape* (*simia capella*) is the one best known to naturalists. On account of its plaintive moaning it has been called the Crying Ape or Weeper. There are many genera of various colors, the most common being brown, of darker or lighter shade, in size never exceeding a foot and a half, with tails nearly of the same length. They are pretty, lively, and gentle little creatures, and very easily tamed. Their food is fruit, insects, snails, and the eggs of birds. They live very peaceably with each other in large companies, and only quarrel at times about some peculiarly fine fruit which one may have found. Clustering around the finder, the others try all means in their power to disturb him in the enjoyment of his treasure, by crowding together, grinning, making horrible grimaces, and screaming all the time in the most ludicrous manner. After such efforts the unlucky owner is seldom able to retain his prize. It is most laughable when the fruit—as the wild pine-apple, for instance—is beset with prickles, for then neither the lucky finder nor his envious rivals can eat it. If observed from a distance undisturbed, they are seen to scratch their heads and hands with a doleful expression, but at length they throw the fruit here and there until the prickles are all flattened

or broken off. Although cunning, they are cowardly, for if any one comes near, they leave the booty, scamper off to the trees, and if the aggressor takes up the fruit to carry it off, they never seek to defend it, but make frightful grimaces, and showing their teeth, utter cries of anger. They exhibit great tenderness for their young and show much sagacity in guarding them carefully from an excess of fruit before they are weaned. If the little monkey will eat gluttonously, he is first admonished by a reproving grin, if this fails to deter him, it is followed by a box on the ear. These apes are as cunning as they are lively and fearful; they will approach a plantation with great caution, and, conducting their ravages with much ingenuity, steal everything within their reach. Pomegranates and maize they are fond of, but vanilla is an especial dainty. It is, however, a touching sight when a mother ape is shot—the young ones never leave the body until it is cold and stiff, and when separated from it, will utter cries of bitter lamentation. They soon, however, become accustomed to the society of human beings, and, like other domestic animals, show their attachment to their masters not only by rendering a cheerful submission, but by seeking to defend them if assailed. Of a gentle nature, it is only after repeated ill-treatment that they become angry and bite; nevertheless, they are fond of teasing other animals; for instance, they will pull off the bridles of horses which are hitched, or pluck the feathers out of chickens which are running about, and exhibit great delight to find their mischievous provocation has produced irritation. The Indians understand how to capture these monkeys; if taken when very young, the Indian women, it is said, nourish them at first as they do their children. They

afterwards feed them on cassava, rice, and the juice of the sugar cane, by which treatment they become exceedingly attached to their nurses, and will lament for days when separated from them. A person who owned a Capuchin ape was in the habit of giving him a lump of sugar rolled up in a piece of paper, and on a certain occasion, in order to plague him, a live wasp similarly enveloped, was presented. The animal put it in his mouth, believing it to be sugar, and it stung him. He manifested little irritation, but from that time he held every little package to his ear before he opened it. If the Sajou is teased, he howls or cries most insupportably. He will not take snuff, as do many other monkeys, but rubs it over his whole body with evident pleasure.

THE SAIMIRI.—(*Simia sciurea*.)

This animal is as large as a squirrel, and has a long tail, which is not prehensile; on the back he is of a grayish yellow color with something of a gold luster, fore-arm and shank a fine orange hue, the end of the muzzle is black. One of the prettiest and most amiable apes of the New World, his demeanor is a gentle melancholy, although he will play willingly and with seeming pleasure, and will pursue insects very actively whenever he has opportunity. If any one talks to him, he looks straight into the speaker's mouth, and tries to take hold of his tongue and teeth. When several are together, they keep themselves warm by wrapping their tails around each other and sitting so close that they form a single mass. They can not endure cold, and on this account, are never carried abroad. The *Sakis* belong to this family; they are genuine little monkeys without the

tail being prehensile. The race is numerous—a great many species of Sakis having been found, and all differing in color. We will only mention one—the *Silver monkey* (*simia argentaria*), which is easily distinguished from all the rest by his shining silver-hued coat, black tail, and deep red face. Another family is the Night ape, so called from its nocturnal habits, as it sleeps all day, and never goes forth, except at night, in search of prey. It has large orange-colored, owl-like eyes, with ears very large and erect. The tail is not prehensile, and, unlike other monkeys, it prefers raw meat and young birds to fruit. Of all the American monkeys, they only are rapacious.

## II.—THE OUISTITIS, OR SQUIRREL APE.—(*Hapale*.)

$$\frac{4}{3}, \frac{2}{2}, \frac{1}{1} \frac{0}{0}.$$

The most remarkable of this family is the *Wistiti* (*simia jacchus*), plate 6, fig. 5. This tribe of apes is without cheek-pouches or callosities, and the bushy tail is not prehensile; they differ also in respect of dental conformation from the other tribes of American monkeys. The Wistitis are about the size of a squirrel, the body is thickly covered with silky hair, the tail is bushy and longer than the body; they are agreeable little animals, easily tamed, and, like the Saimiri, soon become very familiar. They live mostly in the primitive forests of Brazil, but belong to no peculiar region, and travel about everywhere in troops; their presence is known by their peculiar cry, which greatly resembles that of a bird. The color of the body is a grayish brown, the tail brown, striped with white, and there are two very singular tufts of long white hair on the fore part of the ears. When they sleep, they roll themselves up in a



ball like the squirrels, and cover themselves with their bushy tails. Their food consists of nuts, insects, and spiders; and, although not much prized as an article of food, they are sometimes shot in order that their flesh may be eaten.

III.—THE BABOON.—(*Lemur.*)  $\frac{4}{6}$ ,  $\frac{2}{2}$ ,  $\frac{1\frac{1}{2}}{1\frac{1}{2}}$ .

This animal differs from all other apes in the conformation of his head, which is shaped like that of a fox. His tail is not prehensile, neither has he cheek-pouches nor callosities. Baboons are mostly of nocturnal habits, sleeping all day in hollow trees, but very active at night, when they sally forth in quest of food, which consists of nuts, fruit, and insects. Some species differ from others of the same family, by their slow but steady movement. The body is long, the limbs uncommonly slender, and the tail has nearly the same length as the body. Their native land is Madagascar.

The most remarkable of this class is the *Mongus* (*lemus mongas*), plate 6, fig. 1. This animal is brown, his face and hands black. He is easily tamed, and when domesticated is good-natured and sociable, but rather melancholy; for he often passes the whole day in a sitting posture and seemingly half asleep. Sometimes, however, the movements of these apes are very active, and occasionally they evince much petulance and cunning. They are fond of fruit and sugar, which they are quite expert in stealing, for they know how to open the chests or boxes in which those articles are kept. Their tongues are rough, like those of cats, are almost always muttering to themselves, and occasionally utter croaking sounds resembling the notes of a frog.

## THIRD ORDER.

## CARNARIA.

The characters which distinguish this family are, that although their extremities, like those of the class mammalia, are furnished with nails, they are rather fitted for moving and means of defense, than for grasping objects, or maintaining a firm hold; therefore the thumb is not opposable to the fingers. They have the mouth armed with three different kinds of teeth, the same already described as belonging to the former class. They live principally on meat, therefore their teeth are sharp and pointed, and the jaws, instead of moving sidewise, are like a hinge, operating from above to below. As they are carnivorous animals, and can find food everywhere, they are not, like the monkey tribe, confined to southern regions, but are scattered abroad over the whole wide earth. This order is divided into three families, viz. : *Cheiroptera*, *Insectivora*, and *Carnivora*, each of which possesses a distinctive character.

## FIRST FAMILY.

WING-HANDED.—BATS, KALONG, RUSETTE, VAMPYRE.

I.—TRIBE OF BATS.—(*Cheiroptera*.)

In these singular animals the fore-arm and fingers are uncommonly long, and from the extremities of the body is a prolongation of skin which serves the purpose of wings, and enables the creatures to fly. The toes of the hind feet, as well as the thumb, are free, short, and armed with a hooked nail, which serves the animal for creeping or suspending itself from some projecting body.

Sometimes the tail is interwoven with the wings, sometimes free, and then again altogether wanting. The progression or walk of these animals is extremely laborious; therefore, when they wish to change their place, they effect it by means of their wings, although the abrupt, unsteady motion differs greatly from ordinary flying. Bats belong to the nocturnal animals that avoid the light; their eyes are very small, and their sight, by daylight, very weak; but in proportion as this one sense is limited, they possess the faculties of hearing and feeling in an acute degree. In many the ears are remarkably large, and are provided with a small membranous covering, which the animal can move at pleasure; and in many the nose is similarly provided, by which it oftentimes assumes a most singular form. By day shunning the light, and averse to the society of other creatures, they remain fixed in dark and gloomy places, such as old buildings, hollow trees or holes, only stirring on the approach of night, to seek for prey. They pass the winter in a dormant state, and remain without eating from the end of autumn until spring. They mostly produce two little bats at a birth, which they suckle and carry along with them as they fly, the young ones clinging so closely to the mother that they can hardly be separated, even after the old one is killed. The genuine tribe of bats is divided into two classes—the carnivorous and frugivorous.

#### 1. FRUGIVOROUS BATS, OR RUSETTE.—(*Pteropus*.)

$$\frac{4}{4}, \frac{2}{2}, \frac{1}{1} \frac{0}{2}.$$

The animals of this class, which are nearly the size of a cat, feed principally on fruit, although they do not

disdain the flesh of small birds. They are found only in India, and as they come in swarms, settling on the orchards and completely devouring the fruit, together with their deformed but yet half human faces, it has given foundation for the old mythological fable of the harpies.

The most worthy of note belonging to this class is the *Kalong* (pteropus edulis). It is of a brownish-black color, changing on the back to a reddish brown; from the tip of one wing to the other it measures from four to five feet. These creatures are found in great numbers in the forests of the Molucca and Sunda islands, where, during the day they remain hanging motionless on the trees. By night, however, they sally forth in troops to the plantations, where they commit the greatest ravages on the fruit, destroying what they are unable to devour. The inhabitants often make war upon them, and sometimes are obliged to cover the trees with nets. They utter a cry resembling that of a goose, and their flesh is considered very palatable, but has a strong odor of musk.

## 2.—CARNIVOROUS BATS, VAMPIRES.—(*Phyllostoma*.)

$$\frac{4}{4}, \frac{2}{2}, \frac{1}{4} \frac{0}{9}.$$

This family are distinguished by having a foliaceous membrane or leaf-appendix to the nose, with a very long tongue, the anterior part of which is studded with small papillary warts. The *Vampire* (*phyllostoma spectrum*), *Spectre Bat*,\* is somewhat larger than our common

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\* Many travelers assert that the vampire, whilst sucking the life-blood from the vein, contributes to the soundness of the victim's slumbers by fanning him gently with his wings.—*Tr.*

bat, and coming forth on his nocturnal expedition, approaches both man and animal so quietly that his presence is never noticed, in order to suck their blood, which he does by making an orifice in some exposed vein. The wound is so slight as scarcely to be felt, and very small, having the appearance of only a trifling abrasion. It is done in the following manner. The cutting teeth are very short, the canine, however, in the upper jaw are very long, sharply pointed, and standing close to each other. Pressing only the smooth outer surface of these teeth upon the skin of the victim, and licking the intermediate space with its soft tongue, the part is soon rendered insensible to the almost minute punctures made by the needle-like points of the canine teeth; this being done, the vampyre sucks the blood it has so ingeniously drawn.\* For some reasons not explained by naturalists, this creature attacks Europeans more rarely than negroes; he spares native animals and birds, but on horses, cattle, and fowls, brought from abroad, he shows no mercy, but abstracts their blood, greatly to their injury, and sometimes to their destruction. There are various species, the largest measuring two feet in the extent of the membrane of its wings. Its flight is uncommonly soft. As the Vampyre is remarkably shy of light, the burning of a fire or lamp would be an effectual protection against their intrusion, if it was not an attraction for the mosquitoes, which would flock around, and render the night

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\* Some naturalists distinguish the Vampyre and Spectre bat as of different families. The latter species is smaller than the one above described, but its habits are similar. It is an inhabitant of South America and New Holland, where it is so numerous that twenty thousand have been computed to be seen within the compass of a mile. It is of a mild disposition, and easily tamed.—NAT. PHIL.—*Tr.*

insupportable. The Vampyre bat inhabits the swampy regions of South America; and travelers relate many marvelous tales of its operations.

THE COMMON BAT.—(*Vespertilio*.)  $\frac{4}{8}$ ,  $\frac{2}{2}$ ,  $\frac{10}{10}$ .

The nose is without the leaf appendix, the ears are upright and of moderate size, and the tail is connected by a prolongation of membraneous skin with the wings. The *Ordinary bat* (*vespertilio murinus*), plate 6, fig. 9, is of a chestnut brown on the upper surface of the body; on the lower, gray. It is a useful animal in destroying many troublesome insects, such as the night butterflies and others of the phalanea order; its flight is rapid and very light, and the species of tact exercised by the whole family through the medium of the membraneous surface of their wings, is so exquisite that they can avoid all obstructions, and direct their course even when their eyes have been removed. Spallanzy, an Italian naturalist, proved this fact by the following experiment: He stretched a number of cords in different directions across a darkened chamber, into which he introduced a bat which had been deprived of its eyes, but the animal, in flying, directed its course as certainly as if in possession of its sight, avoiding all the cords, and passing through the spaces with as much ease and accuracy as though its vision was perfect. Among this family of bats naturalists place the *Horseshoe-nosed bats* (*rhinolophus*), distinguished by having the foliaceous membranes and crests on the nose in the form of a horseshoe (*vespertilio ferrum equinus*), and the Long-eared bats (*oreillardus*), *vespertilio auritis*, whose immense ears, united on the cranium, are larger than the whole head.



## II.—THE FLYING MAKIS.

This family, which inhabits the Indian archipelago, is distinguished from that of the genuine bat, not only by the fingers not being prolonged, but by having an extension of skin, which, stretching from the wrist of the front extremity, and joined to the flank, form a species of great sail. This being set in motion by the limbs of the animal, performs the office of a parachute, which serves to sustain him for a short time in the air, to break his fall from lofty places, or enable him to perform great leaps, in his passage from tree to tree. They do not fly about as other bats.

The *Galeopithecus* (*galeopithecus volans*),  $\frac{1}{6}$ ,  $\frac{2}{3}$ ,  $\frac{1}{10}$ , belongs to this race. On the upper surface of the body they are brown, on the lower, of a rust color. When young, the skin is spotted and striped. They are found in the Moluccas, and feed upon insects, birds, and fruits. In the face and form of the head, they much resemble apes. Little is known concerning their habits.

## SECOND FAMILY.

## CARNIVORA.

In regard to teeth, this family has much likeness in common with the one above-mentioned. The nose, however, which is an organ peculiarly essential to their manner of life, is singularly fashioned. They are small animals with short, but thick and stout extremities, suitable for digging, and, like the bats, are of nocturnal habits. Most of them live in holes or cavities in the earth. Their eyes are small, their sight weak; nearly all are carnivorous, and, as their name indicates, live exclusively on insects. The most important of this class is, first

THE HEDGEHOG.—(*Erinaceus Europæus*.)  $\frac{6}{6}$ ,  $\frac{0}{6}$ ,  $1\frac{2}{2}$ .

Instead of hair, this animal has upon his back a covering of spiky prickles, very stiff and sharp, but which gradually soften into bristles, as they approach the lower surface of the body. The Hedgehog has not only the faculty of rolling itself into a ball, but also of bristling up its prickles so that no enemy can conquer it without being wounded. It is from ten to twelve inches in length; the ears are short; the prickles, of a whitish brown, are ringed with black; the nose, shaped like that of a dog, is also black and moist. The Hedgehog is found in all Europe, and lives in the woods, or amongst hedges, and roots of old trees, from whence they make depredatory excursions to the neighboring vineyards. They live mostly on insects, larvæ, and mice, but nevertheless will occasionally eat birds, eggs, and fruit; some say that they roll themselves over the fruit that falls from the trees to gather it upon their prickles, and so carry it to their burrow; but this account of their habits is most probably fabulous. Seldom seen by day, they keep themselves concealed in their dens, sleeping until night comes, and then only do they venture forth in search of food. This little creature when taken very young, can be domesticated, and becoming very familiar in the household, is of great use in exterminating mice. There is, however, much objection to be made to their presence, as an offensive, musk-like odor exudes from their prickles; they are otherwise unpleasant inmates of a dwelling, for if one enters a chamber by night, its tread is so loud as to awaken a sound sleeper. They swallow Spanish flies (cantharides), which are considered poisonous to every other animal, with impunity, and,

fearless of its deadly venom, will often contend with the viper, and are sure to conquer. Careless of its hissings, or the wounds inflicted on their tongues and noses, they carry on the strife most vigorously with this formidable antagonist, whose poison can not do them any harm. After playing, as it were, for a little while, or until he is tired, with the snake, the Hedgehog seizes him by the head, the whole of which he eats, not even rejecting the fangs, reserving the body for the last part of the meal. With other enemies against whom it would be useless to contend, these animals remain altogether passive, rolling themselves up into a ball, a position which they stubbornly maintain until they are deluged with water, by which means only they can be forced to unroll. The female produces her young to the number of from four to eight, in July or August. They are bare of any covering, at first, but in a very short time the fine prickles appear. In winter these animals are dormant, and as they are really useful in mousing, they ought rather to be cherished and maintained than pursued and killed, as they mostly are. The huntsmen distinguish two species, the Terrier Hedgehog and the common or Hedgepig; the latter is preferred on account of its flesh, which, like that of the wild hog, when roasted is considered very palatable food.

The *Tenrek* (*centetes setasus*),  $\frac{4}{3}$ ,  $\frac{6}{6}$ ,  $1\frac{2}{2}$ , has prickles, like the foregoing, but can not roll itself into a ball, and is without a tail. It lives in Madagascar, is fond of wallowing in mud, digs holes for dwelling-places, and sleeps during the hot season. It is prized as an article of food by the natives on account of its fat flesh. There are several species of the *Tenrek*.

The *Shrews* (*sorex*) are very small animals, principally distinguished by having the upper jaw much longer

than the under. Their teeth, in consequence of this formation, differ in number, standing as follows.  $\frac{2}{2}$ ,  $\frac{3}{3}$ ,  $\frac{4}{3}$ . They keep themselves in holes which they excavate in the earth, and feed on insects and their larvæ. They are divided into the *Common Shrew* (*sorex araneus*), plate 11, fig. 9, which is about the size of the common mouse, and much resembles it, except in the shape of its head, which in the latter is more pointed. The upper surface of its body is dark brown, the lower an ashen gray; on each flank there are glands resembling stiff bristles, from which exudes a humor of a most disagreeable odor; therefore, cats, although they seem to delight in hunting and killing them, never eat the flesh. Their eyes are very weak, but the sense of smelling is very acute; they are exceedingly voracious, living altogether on animal food; vegetables they never touch, but so great is their voracity, that if other means of subsistence is limited, they will eat their own young. They have been accused of being poisonous, and in consequence there is a prejudice against them; this statement, however, is not true.

The *Water Shrew* (*sorex fodiens*) is something larger than the above. It is brown on the upper surface, but white below; its skin, in swimming, has a silvery luster, and it can close its ears when under water so as not to admit a drop. It has its habitation mostly near some stream, occasionally visits the neighboring cellars, and lives on leeches, small fish, spawn, and the larvæ of insects. It is not altogether a nocturnal animal, and is more frequently seen by day than the above-mentioned Shrew mouse, and, on account of its partiality for the spawn of fish, is very destructive to fish-ponds. There is a larger species of the Shrew found in southern

Russia; it is about the size of a hedgehog, and is called the *Desman* (*mygale moschatus*).

The *Mole* (*talpa*),  $\frac{6}{6}$ ,  $2$ ,  $1\frac{1}{2}$ , is divided into two species. The *Common mole* (*talpa europæa*) is well known everywhere. Its length is about five inches, and its body is clothed with a fine silky black skin; nevertheless, there are exceptions, sometimes being found white, gray, and even yellow. Their whole organization is admirably fitted for the subterranean life to which they are destined. Their anterior extremities are short, thick, and shaped like a hand; the muzzle elongated and terminated by a pointed snout; the eyes so small as to be scarcely perceptible, and they are without external ears. The nails are large and very strong, and, aided by the muzzle, enable the animal to dig long galleries in the earth, with great rapidity and skill. Very voracious and living altogether on animal food, they devour young mice, June bugs, and the larvæ of summer beetles, and worms in incredible numbers. The ingenuity with which they dig a cavity in the earth, and fashion it for a dwelling-place, is truly wonderful. The middle space is at least a foot in diameter, and leads into many labyrinthine galleries. The female, in May, produces four or five young ones, which come into the world blind. The small elevations often seen on the surface of the earth and called mole-hills, are thrown up by the little animal where the galleries cross, and by placing a mole-trap there, the skillful burrower is easily caught. One Mole will not suffer the intrusion of another on his premises; the stranger is at once attacked, and a contest for life and death begins, in which strife both parties maintain themselves with equal obstinacy. In one respect the mole is very useful, as it destroys many

grubs. horseflies, and other troublesome insects. The only harm it does is the throwing up mole-hills in the meadows, which prove some hinderance in mowing. The gardens, too, suffer in like manner, but the roots displaced by the digging soon grow again, unless they are those belonging to some tender exotic. Watering the meadows or gardens will drive moles away; they are not torpid in winter.

The *Golden-hued mole* (*talpa aurea*) is smaller than the common mole, with a shorter snout and no tail. Its eyes are not perceptible; its fur is varied like the feathers of birds, with glossy green, golden and bronze color, and is the only creature of the class mammalia which possesses this resplendence. It is found at the Cape of Good Hope.

### THIRD FAMILY.

#### CARNIVORA.

Beasts of prey, being under the necessity of finding their sustenance in animal substances, possess the characteristics of the order carnivora in the highest degree. Endowed with an appetite for flesh, they are also fitted with great strength to seize and retain their prey. Their teeth are very sharp and strong, and the canine teeth stand out before the others. The under jaw moves barely like the joint of a hinge, and although enabling the animal to seize and hold the booty firmly, the side-wise motion necessary for the act of mastication is nearly impossible. The molars, also, are sharp, and operate on each other like the blades of scissors. Only those which, like the bear, badger, etc., feed on vegetable



substances as well as flesh, are capable of moving the under jaw in the sidewise manner suitable for enabling the creature to chew, and therefore have the molar teeth flat. Animals of this family have their feet armed more or less with stout claws, which in most are not retractile and can not be withdrawn, therefore they are blunt. In others, as, for example, the cat, which have them buried in the skin of the paw, and can extend or retract them at pleasure, they remain always sharp. Another characteristic division of this class exists in the form of the hind feet, on which there is either an entire sole that is bare as far as the spring-joint, as seen in the bear, and are termed plantigrada; or else without hair, only on the toes, as is the case in dogs, and are designated as digitigrada. In others, they are horizontally arranged, so that they serve for walking or rather crawling, as well as swimming, as in the seal and other amphibia.

#### I.—PLANTIGRADA.

It is the characteristic of this tribe to rest the entire sole upon the earth, so that many of them can stand in an upright position; like the insectivora, they are nocturnal in their habits, and, in cold countries, pass the winter in a state of lethargy. They generally have five toes on each of the feet.

The *Bear* (*ursus*),  $\frac{6}{6}$ ,  $\frac{2}{2}$ ,  $\frac{6}{6}$ , sometimes more molars. They are large animals, with stout, thick bodies, covered with a coat of coarse hair, and live in caves and dens, which they dig for themselves. In winter they never leave their retreats, but pass the whole season in a profound lethargy, and, with the exception of New Holland, are found in every part of the world. The *Brown bear*

(*ursus arctos*), plate 7, fig. 4. His forehead is arched, his hair brown or of a grayish color; in youth his coat is woolly, but when old, it is shaggy and straight. The young cub has a stripe of white round the neck, resembling a collar. This animal may attain a height of four feet, and sometimes weighs four hundred pounds. He is the largest beast of prey found in Europe, and avoiding the neighborhood of man, makes his dwelling in all the high mountains and thinly inhabited lands toward the eastern boundary; the Tyrol, rocks of the Carinthia, Hungary, Poland, and the ice-plains of Russia are his favorite places of resort. He is a solitary animal, preferring the most inaccessible forests, where he wanders all day, accompanied only by his mate; at night he retires to his den. His sight and faculty of hearing, as well as that of smelling, are perfect; his voice is a low, growling sound, and, notwithstanding his bulky proportions, he moves with great rapidity. In the pursuit of his prey, he exhibits much ingenuity as well as the most indefatigable ardor, and is singularly dexterous in climbing. He feeds much on fruits, preferring those that are sweet and juicy, such as grapes, chestnuts, and strawberries, but has a most decided love for honey, which he will travel miles to get at, and does not scruple to dash right into the midst of a hive, regardless of the bees, for he is protected by his hard skin and thick hair from their stings. The Russian peasants take advantage of this well-known fondness for honey, in order to take him captive, and preferring stratagem to force, they use the following expedient. Having found a tree containing a hive of bees, a heavy block, fastened to a rope, is so regulated as to guard the entrance into the hive; next they lure him to the spot by pouring or dropping honey

all along the way leading from the tree to the neighborhood where bears have been seen ; the animal is sure to smell it, and follows the track until he reaches the tree. The block hinders him from getting at the honey, but determined to possess the prize in spite of all obstructions, he strikes it with his heavy paw, and now, set swinging on the rope, the block, as it vibrates back and forth, comes each time in contact with his head. He grows angry, strikes it again, and the swinging continues until, stunned by the repeated blows on his head, he falls to the ground, where he is soon dispatched by the waiting hunters. They also drive sharply-pointed stakes into the earth under the tree upon which the poor animal falling, is impaled. Another method of capture, resembling the latter, and not less cruel, is this: the huntsmen fasten a board to the tree where the honey is stored, with strong packthread, but so that the cords bar the entrance to the sweet food ; the board, however, is fastened by two strong hempen lines to an extending branch or neighboring tree, in such a manner that when the packthreads, or twine, are broken, it will swing free in the air. The bear ascends the board, which he finds quite convenient, the cords break, the board flies up, and the bulky animal finds his support gone, and himself hanging in the air. The only means of escape is either to let himself down to the ground or climb into the branches. Death, however, is certain ; for, if he jumps down from his insecure platform, he will alight on the pointed stakes, and he is sure to be shot if he stays where he is. He is often killed with spring-guns placed under the bee-tree, the huntsmen being always on the watch, are never far off. A certain method of taking the Bear, and which is not attended with any danger, is

to place honey, in which brandy has been mixed, in his way ; he is sure to eat it, becomes intoxicated, and thus falls an easy prey to his enemies. If he can not get fruit, and is very hungry, he will fall upon cattle, and often commits great havoc among the herds. He is cautious in attacking horses, as he fears their hoofs, from which he is sure to receive a kick on the nose, in which part he is very sensitive. The female bear brings forth her cubs to the number of two or three in January. About eight inches long at the time of their birth, they are neatly formed, pretty little things, remaining blind for one month, and are suckled for three. On the first appearance of spring, the dam brings them out to play in the sunshine, which they seem to enjoy very much, and frolic and gambol as actively and gracefully as kittens. Taken young, they are easily tamed, and can be taught to dance ; but, however tame they may seem to be, they still retain much of their native roughness, and will not brook being trifled with ; ill treatment or blows rouses them to great fury, and when thus provoked they become very dangerous to their keepers. The bear is remarkably fond of music, by no means ferocious, and seldom attacks man unless provoked ; but when wounded, and his native fury is aroused, he becomes very formidable, and, rushing upon his antagonist, clasps him round the body, and strives to crush him in the embrace of his paws. The wary and courageous huntsmen, whose calling leads them to the encounter, fearing nothing from his teeth, but everything from this dangerous hug, encase themselves in a kind of mailed armor, fitted with spear-points ; having aroused Bruin to anger, they quietly await his coming, and suffer themselves to be pressed close within the compass of his paws ; the spears enter

the animal's breast, and, instead of being conqueror, he falls a victim to the fraud by which only he can be overcome. Nevertheless there are many examples given of hunters wrestling so long with a wounded bear that their comrades were obliged to come to the rescue. This wrestling, although common, is highly dangerous in mountainous regions, where the ground is uneven or precipitous; for the bear, with his enemy in close embrace, rolls over stock and stone down into the valley, and the latter can only escape being crushed by having sufficient dexterity and presence of mind to keep uppermost in this tumbling contest. The skin of these animals is much sought after, and the flesh of the cubs considered a dainty; the haunches are the parts preferred; the paws, however, whether taken from old or young, are more highly prized as an article of food than even the haunches.

There are several species of the Brown Bear, which bear more or less likeness to each other; namely, the American, Malay, and Thibet bears. Of these the one most noteworthy is the *Black Bear* (*ursus Americanus*), plate 7, fig. 7. His forehead is flat, his fur black and smooth, his muzzle of a brownish yellow. He lives on wild fruits, and sometimes breaks into cornfields, and occasionally visits the banks of such rivers as are well stocked with fish, which, as he is skillful in fishing, he very well understands how to get at; he never preys upon any of the mammalia unless forced by severe hunger. His flesh is esteemed good eating.

The *Ice Bear* (*ursus maritimus*), plate 7, fig. 1, is the largest of the whole race, measuring five or six feet from the tip of the tail to the muzzle, and in height from four to four and a half feet. His weight often reaches

to a thousand pounds. He differs from the Brown Bear in the form of his head and neck, which are much longer. His muzzle is pointed and his fore paws are not so broad as those of the land bear. This animal inhabits the glacial regions of the northern hemisphere, Spitzbergen, Iceland, Nova Zembla, and Greenland. Not fond of solitude like the European bear, this family lives in companies, and feeds generally on amphibia and fish. They are not essentially carnivorous, although they devour sea-dogs, dolphins, and young walruses, and are often seen assembled in troops around a dead whale. The White Bear swims and dives with great facility, maintaining himself with singular ease in the water, and notwithstanding his bulky proportions, he can travel about the ice-fields with astonishing rapidity. In winter he leaves the icy sea, and seeks a retreat in a more southern region, but never travels so far south as to reach the forests. He can not bear warmth, and therefore, when imprisoned, must be frequently deluged with cold water. It is impossible to tame him, his ferocious and unruly nature ever showing itself. His voice is like that of a hoarse dog; his skin, composed of long, soft hair, is more esteemed as an article of commerce, and brings a higher price than that of the land bear. Assaulted, he pursues the aggressor with the most obstinate pertinacity, swims after, and seeks to climb into the boat which contains his enemy, and his farther advance is only ended by a well-aimed bullet. If any article is thrown to him, he will stop and smell at it, and perhaps play with it for a little while; nevertheless, although thus arrested, he can not be ultimately diverted from the pursuit. A sailor saw a white bear on the ice at a short distance from his ship, and determined to attack it, not-



withstanding the remonstrances of his comrades. Armed only with a lance, he approached the formidable animal, and flinging his weapon, inflicted a severe wound. Smarting with pain, the enraged bear, turning upon his thoughtless assailant, advanced upon him so swiftly, that he was glad to retreat to his ship, which he did with so much haste that he lost his hat on the way. Escape, most likely, would have been impossible had not the animal stopped to seize the hat, which he smelled at for a little while and then threw away. A space, however, was gained by the delay, which, the sailor remarking, pulled off his jacket, and threw it down. This also attracted Bruin, and caused a second halting-place, which was most fortunate, as it enabled the imprudent sailor to reach his boat in safety. A hundred pounds of train oil are reckoned as the usual quantity obtained from the carcass of one White Bear, and the flesh is said to be quite palatable. The liver, however, is considered to be poisonous, producing headache, violent vomiting, and a morbid peeling off of the skin, which continues for a long time.

The *Washing Bears* form a separate division. The *Common Raccoon* (*ursus lotor*),  $\frac{6}{6}$ ,  $\frac{2}{2}$ ,  $\frac{1}{1}\frac{2}{2}$ , is gray-brown with a white muzzle, has a dark brown transverse stripe above the eyes; the tail is long, and marked alternately from one end to the other with whitish brown and black rings. About the size of a badger, he is easily tamed, but although seemingly good-natured and sportive, is nevertheless very mischievous. He receives the specific name of *Lotor* or the *Washer* from the singular habit he has of plunging his food into water, as if to cleanse it, before eating it. Sleeping throughout the whole of the day, he is very active at night, during which he goes abroad in quest of food. The raccoon lives on Indian

corn while in a green state, chestnuts, and fruits, in search of which he is very destructive to gardens and cornfields. He is likewise a great nuisance in the neighborhood of poultry-yards, as he hunts out the nests and sucks the eggs. The female brings forth from two to three young ones in May. The raccoon is a native of North America.

Much resembling this animal, and related to him, is the *Coati* (*nasua socialis*), differing, however, in the form of the snout, which is uncommonly long, and shaped like a proboscis. Its coat is of a reddish brown, changing into gray: it is found in the woods of South America, where it lives on wild fruits and the larvæ of insects. If taken young it is easily tamed, is lively and playful, and, in its captivity, is satisfied to be fed with fruit. If flesh is given to it, it always scratches the same before eating it.

The *Badgers* (*meles*),  $\frac{6}{6}$ ,  $\frac{2}{2}$ ,  $\frac{9}{12}$ , which form a peculiar family, are of low stature, with a cringing gait and short tails. They are nocturnal animals, and distinguished by having a pouch under the tail, from which exudes a fatty, foetid oil. Their forepaws are very strong, and arranged so as to enable them to dig with great effect.

The *Common Badger* (*meles taxus*). The upper surface of the body is of an ashen gray color, the lower black. On each side of the head is a black band. This animal is two and a half feet long, and weighs from thirty to forty pounds. Lazy and morose, he digs a subterraneous retreat, where he lives with his mate. Leading only a nocturnal life, the badger hides himself all day, venturing forth reluctantly in the evening in search of food; he sleeps during the winter. His sense of smelling is so acute as to give him warning of the

approaching hunters even while they are at a great distance. The food of the badger consists of mice, young hares, snakes, frogs, roots, corn, acorns, and fruit. He is fond of grapes, which he will eat to excess. The female brings forth her young in February, the usual number being three or four. They come into the world blind, can be domesticated by man, but never become very sociable or completely tamed. The badger is hunted as being injurious to the crops. This is done in various ways. Sometimes by huntsmen lying in wait until he comes forth, or else by surrounding his burrow with pitfalls, and sending forth dogs to unearth him. But as these creatures resist stoutly and bite fiercely, the dogs are often badly wounded and unable to drive him out; the only plan then is to follow the trail, which is known by the barking of the dogs, and dig him out. The huntsmen sometimes smoke the poor creature out of his lair with brimstone, but this method of conquest is considered cruel, and an outrage on woodcraft. The hair is used for painter's brushes, and the waterproof skin serves for various purposes, such as holsters, coverings for trunks, etc. The fat is said to possess the property of bleaching the hair; the flesh is good eating. The Greeks and Romans seem not to have been acquainted with this animal, as the badger is not named in their zoological history.

The *Glutton* (*ursus gulo*), plate 7, fig. 6,  $\frac{6}{6}$ ,  $\frac{4}{4}$ ,  $\frac{3}{1}$  —  $\frac{1}{1\frac{1}{2}}$ , is also called *Rosomak*. About the same size of the badger, he, nevertheless, appears larger, inasmuch as his hair is longer. His pelage is of a handsome chestnut color, with a dark brown saddle on his back. Such exaggerated accounts of his voracity have been given as seem almost fabulous; nevertheless it is from the pro-

pensity of devouring every thing within his reach, that he derives his name.

*Fjäll* in Swedish\* means "rock," therefore he might with as much propriety be called a "dweller in the rock," as glutton. He is not dormant during the winter. His food is partly of wild berries, but principally of hares, mice, and partridges, and it is said that he does not scruple to leap down from his ambushed lair in the rocky precipice upon the back of the reindeer, which he instantly kills. The glutton never attacks men unless provoked. It can be tamed if taken when young, and taught to play tricks like the bear. Its habit is, however, to sleep during the day, keeping all its vivacity for the night. If irritated, it growls like a dog. Its skin is valued on account of its beautiful color. The female brings from one to two little cubs into the world, generally in May. The Glutton is found in all the northern regions of Europe, Asia, and America.

## II.—DIGITIGRADA.

The animals of this tribe are distinguished by a lighter conformation of body, and very different paws. Unlike the plantigrada, which rest upon the sole, they walk on the end of their toes; hence their gait is lighter, and their speed greater. They spring over walls, and climb trees, and, notwithstanding their small size, are exclusively carnivorous.

There are two species of this genus, *Marten* (*mustela*), namely, the *Pine Marten* (*mustela mardes*), and the *Stone Marten* (*mustela foina*). Their color is

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\* The Glutton, in Swedish, is called *Jarff*, *Tilfrás*, *Snop*; in German *Veilfrás* (*Greateater*), and *Rosomak*.

brown, with black paws and tail; in length, they reach to two feet. Both races so closely resemble each other in form and habits as to be readily mistaken for the same.

The *Pine Marten* inhabits the temperate regions of Northern Europe, and lives in trunks of hollow trees, where it builds its nest. It hunts its prey with great cunning and facility; its food is flesh only, such as squirrels, mice, young rabbits, partridges, pheasants, pigeons, etc. When hungry it is very fierce, and, rushing upon its victim, seizes it by the neck and sucks its blood, but seldom devours the carcass, except when half starved. When satisfied with the first draught of blood, it will play with the prisoner in seeming friendship, but soon seizes it again and draws the remaining portion. The hunters take this animal in traps, or, in winter, seek the tree where it has its lair. It is then easily shot, as, although aware of man's approach, it never flies, but, like the wildcat, remains crouched down along some branch.

The *Stone Marten* is distinguished from the other specimens of the family only by having a white neck, whereas that of the Pine marten is yellow. It lives in waste places, old barns, and under wood-piles, and is very dexterous in getting into pigeon-houses and hen-roosts, where it breaks the eggs, and sucks the contents with incredible avidity, and kills the chickens and birds, the flesh of which it only partly eats, but destroys them mostly for the sake of the blood. The marten gives birth, in May, to four or five blind puppies, which, if taken young, are easily tamed, and become as playful as kittens. They have a hoarse bark like a dog, and are remarkable for their cleanly habits. Nevertheless, al-

though seemingly tame and gentle, they remain vindictive and rapacious.

*Polecats* (putorius). The whole of the species putorius are considered the most sanguinary of all the rapacious animals, and it is fortunate that they are too small in size to work much devastation. They exhale a very strong and unpleasant odor, secreted by two glands situated in the posterior portion of the body.  $\frac{6}{6}, \frac{2}{2}, \frac{8}{10}$ .

To these belong, first, the *Common Polecat* (mustela putorius), which is brown, with yellowish flanks, and white spots on the head; it is about one foot and a half in length, and in form, habits, and manner of dwelling, much resembles the marten. It is found all over Europe, and the northern part of Asia. It sucks eggs, in which it breaks a small hole, through which it abstracts the contents, and makes great havoc among poultry, birds, rabbits, mice, frogs, etc. It is very tenacious of life, and will even when to all appearance it is half dead, bite and resist its enemy. The skin, although good, is not much valued, on account of its unpleasant odor.

The *Weasel* (mustela vulgaris), plate 11, fig. 8. The upper surface of the body is of a chestnut color, the lower white. In winter it changes altogether to white, mingled with yellow. It is only seven inches in length, and in face and figure very much resembles the polecat. The weasel is found in Europe, Asia, and North America. It makes its dwelling in deserted rabbit-warrens, stone heaps, old cellars, etc. It runs and climbs with great agility, and is a useful animal in the fields, where it destroys great numbers of mice. Nevertheless, this good property is more than counterbalanced by the havoc it makes in the hen-roost and pigeon-house, among the young pullets and pigeons, which it kills



with a single stroke. The female brings forth her young in April, to the number of four or five. In the north its fur becomes white in winter, with the exception of the tip of the tail, which always remains black.

The *Ermine* (*mustela erminea*) is ten inches in length, and much resembles the weasel. In summer it is of a reddish brown color, in winter, white, with the tip of the tail black. Its habits are much like those of the foregoing, but it is much more valued on account of its beautiful skin, which furnishes the state robes of princes.

The *Ferret* (*mustela furo*) is somewhat smaller than the polecat, which it much resembles. Its coat is of a yellowish brown; its eyes are red, and its body measures a foot in length. What its habits are in a wild state, is not known; many naturalists consider it to be a species of the polecat. The ferret is employed mostly to hunt rabbits in their burrows, and, trained for that purpose, is kept in a state of imprisonment, lest it should grow intractable, and degenerate into wildness. When let into a rabbit-warren, the little animal is muzzled, and a bell hung round his neck; the entrance to the burrow is covered with a net, in which the frightened rabbits are entangled, as they sally forth at the outlet in a vain endeavor to escape.

Among the other relatives of the genus Marten, is, first, the *Sable* (*mustela zibelina*). This animal is prized on account of its beautiful pelage, which is considered of high value as an article of commerce. It is brown, with gray spots on the head, and has hair on the upper surface of the toes. In size it is less than the marten and larger than the polecat. It inhabits Siberia, and abounds most in the regions clothed with eternal

snow ; it resembles the marten and polecat in its habits, and is fierce enough to attack large hares, etc. Nevertheless it is not exclusively carnivorous, but feeds also on sweet berries, such as bilberries, etc. Sable hunting is extremely arduous and perilous ; the hunter goes forth in the severest winter weather, and, taking with him provision for weeks, makes his home in the snow-clad forest. Here he spreads his snares, into which the animals fall, and are killed afterwards by a blow on the head. They are seldom shot for fear of spoiling the beautiful pelage. A pair of good sable skins will bring eighty rubles, or sixty dollars, so that a cloak of sable is a very costly article.

The *Skunks* (*mephitis*) inhabit North and South America, and are celebrated for their intolerable odor. The most remarkable is the American *Skunk*, also known as the polecat (*viverra mephitis*), plate 7, fig. 2. It is of a dark brown color, with long white stripes, which run longitudinally from the head to the tail. It is about the same size as the marten, which it resembles in its natural habits ; it feeds on birds and their eggs, which it knows how to seek with great address, and devours with equal avidity. When pursued, it flies with remarkable swiftness or climbs a tree, but if in actual danger or overtaken, it diffuses its intolerable odor as a means of defence, so that men and dogs, unable to bear the horrid scent, are obliged to give up the chase. A dog, after once being within reach of it, can never be induced to renew the pursuit. Notwithstanding its possessing such disagreeable means of warfare, this animal has often been tamed, and, in such case, loses its noisome exhalation, or only uses it when greatly excited. Its fur is rough and worthless ; the original natives used to eat the flesh.

The *Otters* (*lutra*) have the toes united by membranes like webs, which serve them for swimming; a broad tail, a flat head, and short ears; they live mostly in the water, and feed chiefly on fish. To this species belong, first, the *Common Otter* (*lutra vulgaris*), plate 13, fig. 2. The back is of a glossy brown; the jaws and chin, together with the under surface of the body, are white. The otter lives in the middle and northern portions of Europe, makes its burrow under the roots of large trees, by the sides of lakes or deep rivers, never sallying from its retreat except at night, when it comes forth in search of food. The otter is very shy, its sight and hearing are particularly acute, and running and swimming with uncommon rapidity, it is difficult to be captured. Its food consists of fish, frogs, crabs, water-rats, etc., and, as it kills more fish than it eats, it is very destructive to the finny tribe. The skin is highly prized. Sometimes the animal is shot, but more frequently it is taken in a trap, set for the purpose. The otter is very tractable, and, if taken while young, can be tamed and rendered as docile as a dog; he will obey his master's call, and can also be taught to fish, although the latter is attended with some trouble, and his services can not always be depended on. The flesh is eaten in Lent.

The *South American Otter* (*lutra braziliensis*) is nearly as large again as the above-mentioned, resembles it closely even to the color of the throat: its habitation is on the banks of the large rivers of South America, where it lives in communities, and feeds on fish. Although very shy, it has a great deal of curiosity, and on the approach of a boat, will thrust its head up out of the water to watch it, but as soon as any danger is apparent, it utters a short bark and dives down under the surface.

The natives know how to entice this creature to appear again by imitating his bark; nevertheless, even when brought within the range of their guns, it is yet not easy to shoot him, as he is very wary and such an expert diver. The dark chestnut-colored skin is of great value.

The *Sea Otter* (*mustella lutris*), twice the size of the common otter, is only found within a few degrees of latitude in the Pacific Ocean. Its black coat of silky and most vivid brightness, forms one of the most precious of the peltries.

The second division of the Digitigrada is composed of the longer limbed animals, which, however, in proportion to their strength and size, are much less sanguinary.

The first of this class is the genus of Dogs.

## II.—THE DOG.— $\frac{6}{6}$ , $\frac{2}{2}$ , $\frac{1}{1}\frac{0}{2}$ .

The race of dogs is distinguished by their soft tongues, the well-formed projecting muzzle, their fore-feet having five toes and the hind ones four.

The *Domestic Dog* (*canis familiaris*) is distinguished from other species of this genus by his recurved tail, as well as his peculiar bark, and also because he is the only carnivorous animal that attaches himself to man, and serving him with unlimited fidelity and affection, let circumstances be what they may, he never forsakes his master. It is said by naturalists that there are seventy varieties of dogs, differing so greatly from each other in size and form as to render it doubtful whether, indeed, they belong to the same race. Without endeavoring to prove the truth of this statement, we will now proceed to mention the principal races of dogs. These, however, are of such infinite mixture, from climate, food, and other

causes, that the origin of the dog that trots familiarly beside his master can not easily be recognized.

I. *The Domestic Dogs*.—This class embraces, as watch dogs : the shepherd's dog, butcher's dog, bull dog, mastiff, and Pomeranian dog ; as parlor dogs : the poodle, pug, pincher, Bolognese, etc.

II. *Hunting Dogs*.—The hound, pointer, spaniel, badger dog, setter, etc. It would be too tedious to attempt a close description of these races. We know enough, however, of the first mentioned species to be able safely to assert that in character and interior qualities they approach nearer to man than do hunting dogs ; they are more faithful as well as more sociable and familiar, understanding every word of their master, while the hunting dog, whose capabilities are more subservient for outer activity, although equally obedient to commands and faithfully following his duty, seldom attaches himself to or wins the confidence of those whom he serves, in the same degree as the former. The shepherd's dog has long been considered as the original ancestor of the whole race of dogs ; nevertheless in the many changes which have occurred in consequence of climate, education, and from other causes, it is hard to determine how far this supposition is correct.

Created to be the steady companion of man, the dog, like his master, bears every change of climate, although in the extreme south latitudes, as well as the severe north, he changes his natural tendencies so far that, instead of being the associate of man and the guardian of his flock, he performs his duty to him as a serving domestic. Dogs reared in Europe, when carried to tropical regions, lose their liveliness and vigor, become mangy, weak, and soon die ; but that they gradually

lose their voices, or that the dogs native to those regions—and most of them are hunting dogs—can not bark, is untrue. In Kamtschatka and Lapland he serves as an animal of draught. In China as well as the South Sea Islands, he performs the part of a hog, and, as he there feeds only on fresh and sweet fruits, his flesh is used for food. In the temperate regions, however, he appears in his own true character, is docile and obedient, recognizes his master and his friends, shows his dislike of intruders, and performs his allotted duties with proud fidelity. Is the guardianship of the house committed to him, he makes his nightly rounds, scents strangers from afar, and if they stop or attempt to break in, he flies upon them, and, by furious barkings, gives the alarm. Generous, even to the unworthy, he seldom tears the intruding foe, but, content with having conquered, he holds him safely until some one comes, satisfied to prevent him from injuring any further. Educated by man, the dog has acquired a superiority over other animals, which gives him a well-merited importance in the field of nature, and makes him invaluable, either as servant or friend. Placed as guardian over a flock, he commands at its head—order and discipline are the fruits of his vigilance. He protects his charge from the assaults of wolves, and, at the word of the shepherd, drives them to the spots where the best pasture is to be found. In hunting, his understanding is equally displayed; he seeks the animal to the chase of which he has been directed, with a sagacity and perseverance altogether unequaled, drives it into the toils of the huntsman, and so truly have all his natural and acquired talents been subjected to the rule of man, that his master can command him to the most savage uses, as is well proved by the account given of



the conquerors of South America, when—to the shame of mankind—it is said, they were hunted upon the innocent natives, as they were used to be on beasts of prey. The dog remains most faithful in the business which is most accordant with his nature, and gains the love of the master who leads him to it; as, for instance, the butcher's dog cares nothing for one who does not slaughter animals, but after witnessing such an operation once, he can not be induced to leave the master who deals in blood. This trait is more plainly exhibited in the hunting dogs. The best spaniel will forsake a master who shoots without bringing down game; and if several hunters go out to the chase, accompanied by one dog only, the animal will stay by the one who kills the most birds.

The attachment of a dog to his owner is so great, and his sagacious instinct so perfect, that he would not only detect his presence among thousands, but would recognize any article that had belonged to him. A farmer once made a visit to the city, accompanied, as usual, by his dog, and finding that, on this particular day, the park was open to the public, he determined to go there, and accordingly, after first shutting up his dog, he went. The place was full of people, and after a short time, the farmer, wishing to see how time sped, in attempting to pull out his watch, found it was gone; a pickpocket must have been near him in the crowd and taken it. He went back to the inn, released his dog, and returned with him to the entrance of the park, where he stationed himself to await the time when the multitude would come forth. Not more than half an hour had elapsed, when a well-dressed, rather gentlemanly-looking person came forward. The dog barked loudly, and leaped upon him as though

about to tear him. The farmer was, at first, quite startled. Was it possible that one so apparently a gentleman had stolen his watch? But he could not doubt the sagacity of his dog, and calling a police officer, they detained the seeming gentleman, and on searching him, found not only the farmer's watch, but snuff-boxes, handkerchiefs, and various other articles which he had stolen.

The dog not only possesses a high degree of memory, by which he remembers any article that belongs to his master, or the scent, which enables him to trace it out when lost, but also the sagacity to find what belongs to others, when his master commands him to the search.

The most remarkable of the race are the dogs of St. Bernard, who travel unweariedly through the snowy passes of that Alp, to find and rescue the half frozen travelers who have been lost on their perilous way. If one is found, as is often the case, nearly covered up by the snow, the dogs at once commence licking the hands and face of the stranger with their warm tongues; one of them, however, goes back to the cloister, in order to bring the monks to aid in the rescue of the wanderer.

The generosity of a Spanish bloodhound may be mentioned in this place. His cruel master had more than once baited him on such of the Indians as had not fully paid their tribute. A poor old Indian woman had been dispatched by her family, to carry the little they had been able to scrape together, in order to satisfy the demand. This, however, it failed to do. The viceroy was not only indignant at the smallness of the amount, but careless of the natural ferocity of his bloodhound, hunted him on the poor old woman, who fled as fast as her aged limbs would allow. The dog soon overtook her, but instead of seizing her, as was expected, he only

smelled of her garment, and then, as if actuated by an emotion of pity, turned back quietly, and suffered her to proceed unmolested. The generosity of the dog did not pass unobserved by the master. A more humane feeling was awakened in his breast, and no further attempt was made to molest the aged traveler.

Gelert, the favorite dog of Lewellyn, Prince of Wales, the grandson of King John of England, who reigned in the beginning of the thirteenth century, has been celebrated both on account of his fidelity and tragical end. The Prince one day went out to hunt, but left his dog at home. On his return, Gelert met him with many demonstrations of joy, but Lewellyn observed that his muzzle was stained with blood, which had run down also upon his breast. Bloody tracks led also to the chamber of his son, whom he called on most anxiously by name, but received no answer. Seeking him every where without effect, a most horrible suspicion took possession of his mind. The dog must have killed the child, and with the words, "Accursed beast, thou hast murdered my son," he plunged his hunting-knife into the heart of the poor animal, that, with entreating look and supplicating moan, thus met his death from the hand of the master he loved. A farther search disclosed the boy, safely hidden behind the tapestry. He had fallen asleep, and only now, awakened by the bustle, came forward unhurt. Near to him lay the dead body of a large wolf, with which the faithful guardian of the child had had a severe battle before he killed him. Filled with sorrow for his rash deed, the Prince placed a splendid monument over the grave of the faithful Gelert, upon which he hung his bugle and hunting spear.

The female brings four or five puppies to the world,

which do not open their eyes until the tenth or twelfth day. At first they are quite helpless, but soon grow very rapidly, and unless seized by such diseases as young dogs are subject to, they pass very lightly through the teething period. Although this animal is by nature very voracious, and can be taught to love dainties, he can subsist for many days without food, and, for the most part, never receives more than one meal a day. Fresh water is altogether essential to his comfort—some say even more so than food. A mixture of vegetables with meat is the most healthful nutriment for him, yet he will eat any kind of offal, and even bones. These last, however, are rather dangerous, as the splinters sometimes stick in the throat. Some dogs are too dainty to eat meat alone. For such it is cooked up into soup, with vegetables; but this is unnatural food, and consequently not good for them. The usual duration of a dog's life is twelve years, and sometimes, but very rarely, is it extended to twenty.

It is, however, greatly to be regretted that the good received by man from this faithful animal is counterbalanced by a terrible evil, which changes the faithful friend into a dangerous enemy. This is madness, or hydrophobia, against which no medical treatment has as yet been found to avail. The symptoms of this fearful malady are first, a want of spirit; then a slow, creeping, or unsteady gait; no longer acknowledging obedience to his master, the poor animal tries to find a dark, cool place, where he eats unnatural substances, such as straw, earth, etc., snapping from right to left, as if urged by some painful impulse, and no longer able to discriminate between friends and strangers. It was once believed that the sight of water brought on the paroxysm of madness; this opinion is, however, now exploded, and it is

thought that the emotion exhibited on seeing the pure element the poor dog loves so well, is on account of his desire to drink and inability to do so, as it is supposed that either his tongue is paralyzed, or cramps have occasioned a painful stricture of the throat. Death comes at last, and life ends in terrible convulsions. This dreadful disease is communicated to every creature bitten by the rabid dog, and the man who has received the fatal poison at once gives himself up as lost. The only chance of relief is immediate excision of the flesh where the wound is, or extracting the poison by any means before it can have entered the circulation; submitting to strong medical treatment, and keeping the bitten part in a state of suppuration for months.

In Turkey, as well as other southern lands, wild dogs are found, which are only distinguished from wolves by being easy to tame. In Turkey\* they are real plagues, as every canine family has its own district, where its members harbor, stealing every eatable they can find; by night, too, they are very dangerous, for, when driven by hunger, they will attack men.

The most remarkable wild dogs are those found in northern Hindostan, as well as in the province of Nepal, and towards the south as far as the coast of Coromandel. In shape and color they much resemble the fox tribe, but they are larger and stronger. These dogs hunt in packs of six or seven, by day and night, and follow their prey more from scent than sight. They give tongue, like the hound, but their bark is peculiar, and is as different from that of the domestic dogs, as is the cry of the jackal or the barking of the fox. They destroy a great

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\* It is said the cities and villages swarm with dogs, allowed to wander as a constant defense against strangers or enemies.—*Tr.*

deal of game, together with rapacious animals, attacking even tigers. Two races of wild dogs are recognized by name; the *Pariah*, not unlike the large farm-dog, is of a reddish brown color, with pointed ears, and inhabits the jungles on the lower declivities of the Himalaya mountains, and the *Dinga*, which is a native of Australia, and greatly resembles our shepherd's dog. All wild dogs have a peculiar bark, and are very difficult to tame. Some modern naturalists insist that the wolf and jackal are nothing more than wild dogs, and not representatives of separate races.

The *Wolf* (*canis lupus*), plate 7, fig. 8, is about the size of a strong butcher dog, of a grayish yellow color, with a straight tail. In the far northern regions, he becomes white in winter, and is found all over Europe, in the west of Asia, and north of Africa, and also in North America. As to his great size, strength, and dexterity is united an unsatiable rapacity, he is considered the most dangerous of all the ravenous animals, and is, therefore, hunted with less mercy than any other. By nature he is lazy and cowardly; hunger, however, makes him bold and cunning, so that he understands how, by many dexterous artifices, to enter the sheepfold. When he has stolen a sheep he carries it off, over stock and stone, with great ease. In sagacity he not only stands next to the dog, but, in some respects, surpasses him, inasmuch as in running or pursuit of prey, he is indefatigably persevering. Having satisfied his voracious appetite to repletion, he retreats to his den in some caverned rock, where he remains until driven forth once more by hunger. In such thinly populated districts as is found in Russia and Poland, the wolves often follow the sleighs of travelers in troops, and, making fierce



• battle, conquer and devour them, as well as their horses. The dog, having killed his game, watches over or carries it to his master. The wolf, on the contrary, eats all at once. Devouring whatever comes in his way, and the most unnatural of all brutes, he scruples not to feast on the carcass of his brother wolf which he may find. His voice is a prolonged howl rather than a bark. A cowardly animal, he is afraid of music, and can not bear the sound of a violin, and the Polish peasants relate many tales of the adventures of poor fiddlers, who, traveling home at late hours from playing at the Russian festivals, have been indebted for their lives to their fiddles, which, on scraping lustily when the wolves were in sight, caused them speedily to retreat. In Germany, the race is now nearly extinct, but in the countries above named, together with Hungary, France, and Spain, they still abound. They are either hunted down by parties of men and dogs, or taken in traps; as their voracity is well known, they are sometimes killed by throwing poisoned meat among them. Taken young, they can be tamed; but never, unless deprived of sight, do they become altogether accustomed to the society of men; there are some examples, however, of their having done good service as shepherd's dogs.

The female wolf produces four or five puppies at a birth, which she carefully conceals under the rocks, in the thickest forests. She is exceedingly tender to her young ones, which, like dogs, come to the world blind, bringing constantly to her den young hares, rabbits, partridges, or whatever she can catch. These she never kills, but brings them living, in order to teach her puppies how to seize and kill their own prey. If, however, they are awkward, or too noisy in the practice, she ad-

monishes them by a bite or stroke from her paw. The peculiar odor of the wolf is so disagreeable to dogs, that they can hardly be forced to attack them, and the flesh is so disgusting that no other beast will eat it. The only use made of this spoil is the skin, which is made into hunting cloaks.\* The *Black Wolf* is a variety of the above described; the same species is found in America.

The *Jackal* (*canis aureis*), plate 7, fig. 3. Somewhat less than the wolf, although resembling him in form; his muzzle is more pointed, and his tail shorter. His color a yellowish brown, mixed with black, is, towards the ears, of a lighter yellow. The jackal inhabits Arabia, Persia, Armenia, Guinea, and the Cape of Good Hope. He possesses all the voracity of the wolf, but is even more cowardly, and feeds more exclusively upon carrion. These animals live in communities, and follow in the rear of caravans, in order to prey upon the *débris*; but, although so excessively cowardly, they are also impudent animals, for, when hungry, they will carry off one of a flock under the very eyes of men. Their voice is something of a wailing howl, and they dwell in caverns which they make for themselves.

The *Fox* (*canis vulpes*), forms a separate variety of the genus Dog, and is distinguished by a longer and more bushy tail, as well as by the pupil of the eye, which, like those of cats, presents the form of a vertical slit. The one best known is the *Common Fox*, which has a red coat, with the point of the tail white; sometimes, indeed, he is of a sorrel color (*Sorrel Fox*), with the tip of the tail black. Is spread all over Europe, from Sweden to the south of Spain, and is also found in the

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\* Dogs and horses manifest an equal antipathy to the skin as to the living animal.—SKETCHES OF TRAVEL IN RUSSIA.—*Tr.*

north of Africa. The fox lives with his mate either in a retreat contrived by himself, or takes possession of a deserted badger hole, and is more of a nocturnal than a day-thief. Whilst the wolf and the jackal roam everywhere, the fox establishes himself in some particular neighborhood, where he can have access to farm-yards, from which he gathers great spoil, at the same time conducting his operations so carefully, that, however well watched, it is hard to trace him. He does not feed entirely on flesh, but goes after fruit, such as grapes, pears, plums, and such others as are sweet. He has, however, a decided preference for poultry, birds, and young hares, nor does he scruple to seize upon a roe calf. But his gluttony accommodates itself to every thing, and in case of necessity he is content to eat mice and the larvæ of beetles. Voracious as the wolf, he has not the same strength; therefore he makes up for the deficiency in a greater amount of cunning. His very movements are indicative of caution; never leaving his forest by a straight path, he crawls backwards and forwards to see if any one is near; finding himself secure, he then travels to the nearest farm-yard, where he lays his plan to secure the poultry. Creeping slyly around the hen-roost, he digs an entrance for himself, and seizes one fowl after another; this done, he carries off part of his spoil, and stows it carefully away until he finds it convenient to dig up the hidden treasure. Hunters tell many tales of his artifices, some of which are quite droll, particularly the trick by which he cheats young hares. In the warm evenings in May, these merry little creatures go out to play in the moonlight, chasing each other, jumping, and turning sunsets, etc. The fox is near enough to remark their antics, and coming amongst them, he plays

as merrily as the rest. This friendly intercourse, however, does not continue very long; the merciless thief soon seizes one by the neck, and eats him up. His greatest stroke of cunning, is, however, that which he exhibits when pursued or wounded. He feigns himself to be dead, until his enemy comes near and is about to take him, then he bites most fiercely, and, if possible, tries to escape. His tenacity of life is incredible; "I once, when out on a chase," says an author, "shot a fox, and as he feigned to be dead, I not only struck him on the nose with so heavy a blow as nearly to make him senseless, but let the hounds worry him until no sign of life remained. I then took him by the tail, and in order to be certain that he was dead slung his head several times against a tree, and tying his feet together, slung him over a pole, and gave him to one of the huntsmen to carry. The man threw the burden over his shoulder, and trudged on merrily for about half an hour, when the sly animal began to snap and bite, and might have seriously injured his bearer, had I not remarked his movements, and ended them with a blow from my gun."

The young foxes, like dogs, come into the world blind. They are easily tamed, although to strangers they are saucy, and disposed to quarrel; as long as they are young, they are fawning and gentle with those they know, but uncommonly gluttonous; as they grow older they can not be trusted, and always become wild and savage. In England fox-chasing is considered as good sport; the animal is hunted down by a pack of hounds, and men on horseback; in Germany he is either pursued in regular chase, like other game, or dug out of his burrow, as the badger. Winter is the time for taking foxes in traps, which must be very carefully laid, as an old

fox is very ready to find out the snare, and avoid its neighborhood, or else knows how to spring the trap, so that he can eat the bait, leaving it empty. If he has been caught by one foot only, he bites off the imprisoned member, and goes away without it. His flesh is said not to taste badly, and his skin is useful. Foxes of different form and colors are found in America and Africa, the most important of which, on account of its beautiful pelage, is the *Blue Siberian*.

The *Civet* (*viverra*) ranks next to the fox. The tongue is rough like that of cats, and their nails are more or less retractile; all of this genus have a pouch containing an oily substance, which frequently exhales a very strong, and to some not unpleasant, odor.

The *Civet Cat* (*viverra zibetha*) is ordinarily of an ash color, spotted with black or has half stripes on the tail; on the sides of the neck are also black stripes; it is about two feet long. This animal is a native of southern Asia, but is acclimated in more temperate regions, and kept in a domestic state on account of its valuable perfume, which furnishes a desirable article of trade; it is taken from the animal at stated times and by artificial means. The habits of the civets resemble those of the cat; they climb up trees, eat birds, small animals, and crabs, which they catch by thrusting their tails into the water, and to which the last-named readily adhere. In their domesticated state, they are fed on eggs, poultry, and sweet fruits. There are several species in Africa.

The *Genet* (*viverra genetta*), has a pouch like the civet, which, however, yields but a trifling amount of perfume. Its color is gray, spotted with black and brown, has a black muzzle, white spots in the face, and the tail ringed white and black. It is met with in Bar-

bary, Senegal, and the Cape of Good Hope, and is also found in the south of France and Spain, mostly in the neighborhood of brooks and springs. Its skin is an important article of peltry.

The *Ichneumon* (*viverra ichneumon*) was famed in ancient times, and worshiped by the old Egyptians, who believed it crept down the crocodile's throat and killed it. In size and form it resembles the marten, is of a grayish brown color, with black tufted tail, about one foot in length, with hair coarse and dry. It is, although rapacious as the marten, very shy and timid; nevertheless its services are very important, as it destroys great numbers of crocodile eggs and serpents; it suffers itself to be tamed, and is then as gentle and tractable as a cat. It becomes a favorite when domesticated, as it rids the house of mice and other small reptiles, which are common in that country.

Next to these come the following group of carnivorous Digitigrades, which are the most cruel and savage of all the class. They are separated into two genera—hyenas and cats.

The *Hyena* (*hyæna*),  $\frac{c}{6}$ ,  $\frac{2}{2}$ ,  $\frac{1.0}{8}$ . These formidable animals, although possessed of great strength, are very cowardly, and subsist more on carrion than by taking living prey. The most remarkable is the *Striped Hyena* (*hyæna striata*), plate 7, fig. 5. It is nearly of the size of a wolf, and one of the most repulsive and disgusting animals in the world. Its quadrilateral head is seated upon a hog-like neck, its ears are erect, long, and naked, and its large eyes look out uneasily from behind its bushy cheeks; the back is elevated, the tail like that of a hog; the whole body is covered with long bristly hair, which forms a mane along the back, the color of which







is a foul yellowish gray with black stripes on the sides. Timid and solitary, these animals live in caverns, from whence they issue forth at night to find dead bodies, on which they feed, and, indeed, seek them even in burial-places, where they frequently dig up corpses from the graves. They very seldom venture to attack men or animals openly; their mode of warfare is to pounce upon them treacherously from behind. So great is their cowardice that a stout-hearted man can enter their dens, throw a covering over their heads, bind them with cords, and carry them off, without their giving battle. Their cry is like the laugh of a human being. Taken young, they can be tamed. The ancients believed many absurd tales, which were related of these animals; that they could change themselves into human beings, and were actuated by human passions. Larger, more rare, but resembling the above-mentioned in habits, is the *Spotted Hyæna* (*hyæna crocuta*); it is of a yellowish gray, and answers to the description of the Krokottas of the old Greeks.

### III.—GENUS CAT.—(*Felis*.)

Of all the carnivora, the animals of the cat kind are the most completely armed. Their heads are round, their muzzle short, and their retractile nails are so hidden in a state of repose, that they never lose their point or edge, but, by the action of elastic ligaments, can be thrust forth at pleasure. They are of different form and size.

At the head of this genus is placed the *Lion* (*felis leo*), plate 8, fig. 1. This lordly animal is distinguished by his majestic bearing, as well as color and size, which

is eight feet in length and three in height. The male has a bushy mane that clothes his neck and shoulders; it is of a black or brown color, and sometimes extends to the lower surface of the body; the tail is four feet long, and has a tuft of hair or tassel on the tip. The head is square, the forehead high, the eyes large and expressive; the gait noble and imposing, indicates both courage and strength. The breast is broad, the air haughty; his whole bearing is calculated to inspire respect; therefore he has appropriately been called King of the Beasts. His native home is found in all Africa and the southern half of Asia; in early times he was also found in Greece. Lions were at one period so abundant in Africa, that Julius Cæsar had four hundred brought to Rome at one time to be employed in combats. The voice of the lion is a deep roar, of a sound something like that of the letters O and U, seeming as if it came out of the earth, because in uttering it he sinks his head on a level with the ground; thus the frightened animals are not able to know in what direction this formidable foe is, but either fly at random or remain rooted to the spot, as if paralyzed by terror. When seeking for prey, the lion moves cautiously along until he finds a hiding-place behind some thicket or rock; here he crouches down in patient expectation until his prey comes within a proper distance, and then makes a powerful spring upon it, which is mostly successful. If he misses, he goes back quietly to his ambush, as if ashamed of his failure; but if the doomed animal takes to flight, he pursues it swiftly. In carrying his booty he exhibits great strength and dexterity, and will bear off a large ox with as much ease as if it was a sheep. The lion never attacks men except when irritated; and it is said,

that in the very act of springing, he can be awed into arrest by the human eye ; in such case, keeping within bounding distance, he will lie down at full length, roar, gaze on the magical object for a while, as if transfixed by its influence, then, irresolute, like one within an enchanted circle, he alternately retreats and advances, continuing to do so until at length he goes away altogether, as if he dared not cope with man. In Algiers lions are often found lying across the paths by night ; but if a traveler coming along bids them, in a commanding tone of voice, to rise, they will obey, although grumbling ; nevertheless, after proceeding a little way, they are sure to return, and lie down as before. The instinct of the lion teaches him to respect courage, and while he suffers the bold antagonist, who approaches him undauntedly, to pass unmolested, he kills the coward or unsuccessful marksman, whose bullet has been sped against him without effect. Springing upon his victim, and throwing him down, he stands over him awhile, as if exulting in his conquest ; then, satisfied with such a display of his power, he dispatches his prostrate enemy with repeated blows of his foot ; animals, however, he kills at once.

The lioness produces three or four cubs at a birth, carefully concealing the little creatures among the rocks. They are at first very small, but soon grow, and then become playful as kittens. While nursing her young, the lioness is the most rapacious of all beasts, seizing on every living thing in the neighborhood of her den, and woe be to the huntsman who would at this time dare to attack her. Captured young, the lions become as tame as dogs, and evince more affection for their masters than any other animal of the cat kind ; but even when subdued by imprisonment, he will not submit to any force or undue

restraint even from his master, and knows how to maintain his haughty independence. His tongue is clothed with rough, horny points, which serve him to separate the flesh from the bone ; it is therefore dangerous for his keeper to suffer him to lick his hand, as his rough tongue would bring the blood, which, having once tasted, he is rendered furious, and seizes at once upon the person, whether friend or foe. Old lions seldom become attached to man ; there are examples, however, which show that they are capable of gratitude, and become faithfully attached to those who have shown them kindness.

A traveler once found a young lion half dead in a wilderness ; moved by compassion, he poured milk into his mouth, and bestowed other attentions, by which the animal revived. From this time the creature showed his affection for his deliverer so far as to take food from his hand, and follow him like a dog.

A similar legend tells of a knight in the time of the Crusades, who found a lion which was choking to death from having a bone in his throat ; he withdrew it, and the grateful animal never forgot the favor, but regularly supplied him with game. He became so attached to his benefactor, that when the latter was about to sail for his own country, he swam after the ship as if unwilling to separate from him.

The lion is mostly hunted by men on horses and with dogs ; the party must necessarily be large, as an unsuccessful shot would be attended with disastrous consequences. The barking of the dogs attracts him from his lair ; the huntsmen station themselves in different parts of the forest, for if the shaggy monarch discerned the party, he would fly, and prudently avoid the unequal contest. Irritated by the dogs, he comes forth with slow



and wary steps; the dogs surround and provoke him yet more with continued barkings, but if one is unlucky enough to come within reach of his huge paw, he is killed by one blow. The nearest huntsman must now shoot, but if the bullet has not reached the lion's heart, he rides off—reloading his musket as he retreats—to the next in waiting, who is ready to send a bullet, most likely with better effect, after the now pursuing lion. The sport is not considered dangerous, unless the horse falls; and even then the courage and presence of mind of the rider may save him; for if he stands quietly facing his enemy, looking resolutely into his eyes, the savage beast will turn away to follow the horse. The cowardice of his companions, or shooting either too soon or too late, often endangers the huntsman's life. This was the case with a poor fellow named Rendsburg. The lion bounded upon him, and seized him by his left arm; his cowardly companions, instead of firing their guns, fled, in order to call the Hottentots to the rescue. Whilst the animal was tearing the flesh from his left arm, Rendsburg, with his right hand, drew the hunting-knife he carried in his belt, and gave the lion several deep wounds in his breast. When assistance came, he was found weltering in his blood, with his left side terribly mangled. He had fallen from his horse and was lying on the dead lion, in whose breast the knife was still sticking; in a few minutes, however, the unlucky huntsman breathed his last.

Another instance of cool courage and presence of mind exhibited by the huntsmen of South Africa, is the following occurrence, related to Lichtenstein by a colonist named Van Wyck:—"About two years ago, I met with a fearful adventure on this very spot where we are now

standing. My wife was sitting near the door, my children were playing around, and I was at a small distance outside the house, repairing a wagon, when, chancing to look up, I saw a huge lion approaching. It was about mid-day, and very warm; the animal came forward, and lay down in the shade, close to the threshold. My wife, too much paralyzed by terror to attempt flight, could not leave her seat; the terrified children sought protection, and clung around her. Their cries awoke my attention; I hastened toward the door, but can my feelings be imagined when I found my entrance thus fearfully impeded. Although the lion had as yet not seen me, deliverance from such a foe seemed almost impossible, as I had no weapon of defense at hand; all at once, however, I remembered that my loaded gun stood in a certain spot in my chamber, and scarcely at an arm's length from the window. With a firm purpose but an anxious heart, I crept round to the back of my house, and putting my hand through the window, to my great joy laid hold of the gun, which, happily, was within reach. The door of the bed-room, which led to the outer room, was open, and, looking through, I saw every phase of the dangerous scene. The lion made a movement—most likely he was about to spring—there was no time to be lost. I called my wife by her name, and bade her remain quiet. After taking steady aim, and asking aid from the Great Protector, in hasty mental prayer, I fired my gun. The bullet grazed the hair of my boy and entered the head of the lion just above the eyes; he fell dead on the spot."

The Hottentots use many stratagems to take or kill the lion. One method is to place spring guns near his lair, to which are attached ropes; as soon as the lion treads upon these, the guns go off, and he is killed. An-

other plan is to dress an artificial figure in the shape of a man, and concealing one or more spring guns inside of it, place it in the neighborhood of a flock of cattle; the lion seizes it as prey, but instead of the expected feast meets death. A Hottentot once observing that he was followed by a lion for several hours, concluded that his pursuer was only waiting until the night should come on, when he would make a meal of him. The thought was by no means pleasant, and he determined to baffle his enemy; and having no weapon of defense but a club, he used the following stratagem: As it grew dark he hid himself in the crevice of a rock, and placed his club, on which he hung his hat and other portions of his clothing, close to the edge of a steep precipice, moving it slightly from time to time, so as to make it more resemble a human being. The lion came up with the crouching, stealthy pace of a cat, threw himself on the seeming figure, and falling with it over the precipice, was killed.

These animals pursue Hottentots more readily than they do Europeans. One of the former, in driving his cattle to the water, all at once observed a lion quite close to him. The man mingled with the herd, in hopes that the forest monarch would as readily satisfy his hunger with an ox as a human being, but he was mistaken; the lion was not to be turned from his purpose, and pursued him until, at length, the poor man found refuge in an aloe tree, where he hid himself behind a cluster of birds' nests. Here he thought himself safe; but the lion had not lost sight of him, and approaching the tree, made a spring which, fortunately, proved unsuccessful. His next movement was to walk in sullen silence round the tree, every now and then glancing threateningly up into the branches. Having made several rounds he grew

tired, and at length lay down to keep watch, and never stirred from the spot for twenty-four hours, and then only to go to a spring in order to quench his thirst. Taking advantage of his temporary absence, the Hot-tentot jumped down from his perch, and ran at full speed towards his house, which was only half a league distant, and succeeded in reaching it in safety, although followed by the lion until within three hundred steps of the door.

The imprisoned lion becomes fond of his keeper, is sullen and downcast when he is absent, and exhibits great joy on his reappearance. He becomes accustomed, also, to dogs, and will play familiarly with them; and there have been such examples of attachment between those animals, that the former has been unable to survive the death of the latter. The lion, in imprisonment, consumes daily from eight to ten pounds of raw meat and three pounds of water. It is said that he is afraid of the crowing of a cock, or terrified by the grunting of hogs, but the truth of these accounts is by no means to be relied on. His age usually reaches thirty or forty years, and sometimes, but very rarely, extends to fifty. His skin is of little use, but his flesh is eaten, and is said to taste like veal.

The *Royal Tiger* (*felis tigris*), plate 8, fig. 2, is nearly of the same size as the lion, but is longer and more slender; his head is round; his color, on the upper surface of the body, a reddish yellow; on the under, white, with irregular transverse stripes. Of all rapacious animals, he is the most formidable, as in his ferocious nature, strength, blood-thirstiness, and cruelty are found united. He inhabits the south of Asia—particularly the thick forests of the East Indies, in the vicinity of rivers, where he commits the greatest ravages, both on

man and beast. He climbs up trees with great facility, which the lion is unable to do. An English officer in India, having chanced to ramble in a jungle, a short distance from the station, saw a tiger creeping through the bushes. Although half hidden by them, he soon saw that the animal was keeping pace with him, sometimes stopping quietly, and then again approaching; gradually, however, lessening the distance. Seized with a desire of conquest, instead of trying to get out of the way he discharged his gun, which was loaded with small shot, full at the animal's head. The shot failed, only shattering the right paw, and the rash huntsman was glad to fly. He climbed a tree, up which, notwithstanding his wounded foot, the tiger, maddened by pain, pursued him, and having no means of defense, as he had thrown away his gun as he fled, would have paid for his temerity with his life, but for the timely assistance of a woodcutter, who, following the tiger, first cut the sinews of his hind feet, and soon after ended him by repeated blows.

The tiger is the most fearless and savage of all animals. A troop of English soldiers were once on a march, when suddenly a royal tiger sprang out of the jungle, dragged an officer from his horse, and carried him back into the thicket. Stunned by terror and the shock, he was at first insensible; when he awoke to consciousness, it was to find himself with hands and feet terribly torn, completely in the power of his ruthless enemy. In these fearful circumstances, he had sufficient presence of mind to enable him to draw a pistol from his belt, and send a bullet through the tiger's heart, and was thus delivered from the most ferocious of all robbers. A trumpeter, placed in a condition of similar peril, saved himself by giving a loud blast on his bugle horn, by which the tiger

was so frightened that he ran away and left his prey to escape.

The tiger seldom attacks men thus furiously, except when provoked by hunger; this being satisfied, he seeks his lair. He is by nature lazy and cowardly, and if left undisturbed will not molest men. The wounds inflicted by an angry tiger mostly prove mortal, as the sharp claws penetrate very deeply. By many they are believed poisonous, which is not true. The male is distinguished from his mate by having a short mane, or rather beard, on his cheeks. The tigress is exceedingly careful of her cubs, of which she produces two or three at a birth, hiding them in a thicket, and, if assailed, defending them with the most unparalleled fury. Suspicious and jealous of all approach, she lies in ambush beside the neighboring road, and seizes every living thing that passes by, partly out of anxiety for the safety of her young, but perhaps more from a desire to bring them fresh food. It happened once, in India, that all communication by mail was cut off by one of these nursing tigresses keeping guard on a post-road, and destroying the carriers.

The best means of warfare against tigers is by meeting them with well-instructed elephants; for horses, on account of their great dread of these formidable animals, are of little use in a regular tiger hunt. The manner of proceeding on such occasions is as follows. Some days before the one appointed for the chase, the huntsmen search for places most infested by tigers, which are either the thick woods surrounding coffee plantations, or marshy spots, overgrown with bamboo reeds and high bramble bushes; fires are kindled in a circle, all around the place, so as to prevent the tigers from escaping in the night. The huntsmen, mounted on elephants, now sta-



tion themselves at regular distances encircling the theater of action ; the drivers enter the thicket, armed only with a lance and short-sword, but accompanied by the noise of kettle-drums and gongs. The tigers, alarmed by the din, start up from their lairs and are killed by shots fired by the hunters. In order to drive them out effectually, the dry grass and reeds are next set on fire ; then a regular tumult commences, and a confusion ensues, which is sometimes ended in a most fearful manner. The tigers, enraged and howling, rush out of the thickets, and attempt to spring upon the elephants from behind, and if the marksmen fail to kill them speedily, the wounded elephants, maddened by pain, run wildly hither and thither, and, refusing all control, throw themselves on the ground, thus placing their riders in great danger. If the elephant can reach the tiger with his trunk or teeth, he tosses him in the air, or tramples him to death ; or if he springs upon his head, the huge enemy coolly dashes him to pieces on the next tree. The elephant is only lost when the tiger seizes him by the trunk and tears this valuable organ ; the former, however, is careful to guard it.

Taken young, the tiger is not hard to tame. His bearing has not, however, the noble majesty of the lion ; he is either fawning and hypocritical, like the cat, or else sullen and intractable. Sometimes, indeed, like the lion, he has exhibited great friendship for dogs. His skin is used for horse-covers, and to ornament the harness of sleighs. In the East it is particularly esteemed, and in China seats in halls of justice are covered with tiger skins. Tigers are more numerous than lions. In some districts where they abound, many villages have been deserted on account of their depredations ; and, according

to the statistics of 1819, eighty-four persons were killed in the compass of a few miles.

The following larger animals of the cat-kind are only distinguished from the foregoing by having their bodies spotted or dotted; these are called tigers by the menagerie-men, and the skin is also falsely termed tiger-skin, but neither have any right to the appellation.

To this class belongs the *Jaguar*, or *American Tiger* (*felis onca*), plate 8, fig. 8, which, nearly as large as the royal tiger, is yellowish red on the back, with black rings inclosing a central spot resembling an eye, and forming four continuous bands extending from the shoulders to the tail; the under surface of the body is white, but occasionally it is found quite black. He is to be found in Guinea, Surinam and Brazil, and is considered very ferocious, but, as travelers say, he never attacks man unless provoked. The jaguar is very slender as well as strong; one of these animals being in search of prey one night made an irruption into a farm-yard. In order to effect an entrance, he tore a board from off the side of a stable where a planter had housed his cattle; but as some upright beams still opposed him, he broke the back of a cow with one stroke of his paw. The cry of agony uttered by the victim brought help at once; the jaguar was driven off, but only to return the next night, when a negro, induced by the promise of a large reward, shot him. He loaded his gun with three bullets, and had sufficient boldness to attempt the task alone; but although he killed the animal, it was rather by good luck than by a well-directed aim. The jaguar was an uncommon specimen of his race, measuring ten feet from the muzzle to the tip of his tail.

The Spanish cattle-drivers in Brazil, who are ex-

tremely expert in throwing the lasso, capture the jaguar whilst riding at full gallop, by throwing the noose over his head, and without at all abating their speed, drag him along after them. The natives take him in large traps, which are arranged much like a common rat-trap. They are constructed to represent a kind of block-house, containing a cage in which a pig is confined; the squealing of the young grunter being intended as a decoy. A heavy trap-door is connected by a rope with a board in the inside, and falls the moment the latter is trodden upon. The rage of the jaguar in his ineffectual efforts to break the bars of his prison can scarcely be described.

The female produces two or three cubs at a birth, which become very tame when taken young, but, as they grow older, manifest much of their natural fierceness, and seldom fail to injure their keeper. The traveler, quoted above, tells of one he had tamed which became perfectly familiar, and fond of licking his hands and face; but it died before being fully grown, from eating a vampyre bat with which it had been fed. The jaguar eats every kind of flesh, not even rejecting fish and frogs, which last are refused by all animals of the larger cat species. With extraordinary caution and patience he creeps, snake-like, along the earth, until within reach of his prey; then, springing upon the back of his victim, he strangles, and drags it into the nearest thicket, where he feasts upon the best portions, leaving the remainder for a future repast. His skin is valuable on account of its beauty; his flesh is eaten, and said to be palatable, with the exception of his kidneys, which are abominable.

The *Leopard* (*felis leopardus*), plate 8, fig. 3. The upper surface of his body is yellow, the under white, with eight or ten rows of large, black, rose-like spots;

in length he is from three to three and a half feet, tail two and a half feet long, and his height seldom reaches above two feet; he is a native of southern Asia and Africa, where the species abound, dwelling in the thickest woods, and roaming by day as well as night in search of prey. He is very active in pursuing monkeys, having a great dislike for those animals, and is very expert in breaking into sheepfolds, where, not content with one victim, he strangles several, and sucking the blood, leaves the carcasses. His movements are stealthy and snake-like, and the slender proportions of his limbs render him remarkably agile; and, as he passes along on his way, he examines every hedge, ditch, etc., in order to discover something wherewith to satisfy his voracious appetite. With a sudden and agile spring, he tries to seize his victim, and if he fails—like the lion—he turns back as if ashamed. His voice is something between a snarl and a growl—much like the grumbling of an angry dog. His flesh is white, tender, and palatable, on which account, but still more on that of his valuable skin, he is not only a regular subject of the chase, but is constantly being taken in snares and pitfalls. Taken young, the leopard becomes very tame, following his master everywhere, like a dog, and even when not fed with live prey, will not injure man. Nevertheless he is not to be trusted, for his original nature is capricious, and makes him troublesome. A tame leopard had a boy for a keeper, who once prevented the animal from passing through the gate of the enclosure, inside of which he was confined, although he tried by many arts to escape. One day, however, the young guardian fell asleep on the steps leading into the court where he kept his charge; the leopard came up, and, after striking him with his paw

on the head, so that he tumbled down the steps, stood over him wagging his tail, and seemed quite pleased that he was able to play off such a joke. His favorite place was by the window, which commanded a wide prospect; sometimes the children of the family would try to drive him away by pulling at his tail; he suffered this familiarity tamely, and never showed any resentment at the rude handling, but would lie down quietly. The leopard is said to love perfumes—such as spirit of lavender, etc. He abhors swine, and the sight of an ape throws him into a rage.

The *Cougar*, or American Lion (*felis concolor*), found all over America, is of tawny brown or gray color, sometimes verging on yellow, without spots, and about four feet in length; and though called the American Lion, he is only a caricatured likeness of the forest monarch, resembling him about as nearly as a jackass does a horse. He is cowardly to the last degree, never contending with dogs or large animals, and flies at the sight of a man; nevertheless, being very expert in climbing, he follows apes from tree to tree most perseveringly, and is as sanguinary as the iltis or polecat. One cougar killed eighteen sheep in a single night by making a wound in the neck, from which he sucked the blood. Gorged to excess by his sanguinary meal, he fell asleep in the midst of his victims, where he was found and killed. On being opened, the stomach contained nothing but blood. Taken young, he becomes very tame, and if he were not too dangerous a neighbor to poultry, he might be trained as a domestic animal. He is familiar with dogs and cats, and, on being caressed, purrs like the latter. The manner in which he welcomes his master, is

by crouching down in a corner, and springing upon him as soon as he enters.

The *Hunting Leopard* or *Gepard* (*felis jubata*), plate 8, fig. 3, very much resembles the leopard, except that he is higher and more slender. The nails, like those of the dog, are blunt and not retractile. He has a short mane on his neck; the color of his skin is a dusky yellow, spotted with black; his length is three feet. His home is in Arabia and India. He is easily tamed, and can readily be trained to hunt. With a cap drawn over his head, he is seated on a horse behind the huntsman, who holds him by a chain. On the approach of a gazelle, he is relieved of both cap and chain, and, by a sign which he understands, the animal he is to bring down is pointed out. He then leaps from the horse, creeps slowly and stealthily into the thicket, where he remains until the victim comes within sixty paces of his lair, when he makes a spring, and, seizing him by the neck, holds him fast until the huntsmen come up, after which, the first act is to replace the cap and chain, to which he willingly submits. The next is to cut the throat of the conquered animal, and, collecting the blood in a wooden vessel, it is given to the Leopard, as his share of the spoil. If, in springing, he misses his prey, he goes back to his master, seeming much ashamed, and, unless very much coaxed and caressed, can not, on that day at least, be induced to resume the chase. The Emperor Leopold I. had two of these animals presented to him by the Sultan of Turkey, which proved themselves as expert hunters in Germany as they had been in their own land.

The *Tiger Cat* or *Panther* (*felis pardalis*) has short, tawny yellow hair, elegantly marked with black spots, disposed in circles of four or five each, with a single



spot in the center ; is nearly as large as the lynx, and, although found all over the western continent, is most abundant in South America. It is the most beautiful of the cat kind, except the leopard, and is distinguished for its agility in climbing trees. He is a very dangerous neighbor to poultry-yards, from which he carries off one fowl after another, and is so greedy in pursuit of this species of prey, that he is easily lured into a trap, which is baited with a chicken. Taken young, the Panther may become as tame as a cat, but can never be prevented from devastating the farm-yard.

The *Lynx* (*felis lynx*), plate 8, fig. 7. The fur of this animal is of a reddish brown color, obscurely marked with small, dusky spots, the ears are gray, and tipped each with a long pencil of black hair. His length is three and a half feet, and in height reaches to nearly one foot and a half. The lynx makes his dwelling-place in the thick forests of Europe, and in rapacity only exceeded by the wolf, is quite as much dreaded. Creeping from his lair in the caverned rock, he marks the place where the animals herd, and, climbing up a tree, leaps down on man or beast, whichever may stand below. He seizes the victim by the neck, lays open the veins of the throat, sucks the blood, eats part of the flesh, and buries the remainder. He is a very dangerous neighbor to the flocks which feed among the hills, and for which he constantly lies in wait. The lynxes found in the north of Europe produce the handsomest fur ; soft and warm, it forms a profitable article in commerce – a single skin being valued at from twenty to thirty dollars. There are several species.

The *Common Cat* (*felis catus*) is from one and a half to two feet in length, with a tail somewhat exceeding

twelve inches. The cat tribe is divided into two families, the Wild and Tame.

The *Wild Cat*, also called *Catamount*, plate 8, fig. 4, is of a reddish gray, with dark transverse stripes; has a thick tail annulated with black. It is found in the middle and south of Europe, very rarely elsewhere, and dwells in crevices of rocks or forest dens. It pursues pheasants and hares with great agility, and lies in wait for young deer, upon which, like the lynx, it pounces down from its lair in a tree. These animals come to the world blind, from four to six at a birth, like the common cat. The chasing of the wild cat is considered very dangerous, for if the huntsman's bullet fail of the mark, the enraged animal will spring upon both dogs and men, biting and scratching most furiously. They are taken in traps baited with catmint and valerian, of which they are very fond.

The *Domestic Cat* (*felis domestica*) very much resembles the wild cat, but is smaller. It is probable that this race has sprung from the above-mentioned. This opinion is, however, by no means general, many insisting that the domestic cat was originally brought from Egypt. There are many varieties belonging to this family, all differing in color, and are found in all places inhabited by man, from the remote south to the cold regions of Iceland and Greenland. Domesticated in the household, they are not submissive and attached to their masters, as are dogs; they are fawning, greedy, envious, and selfish; can not be taught to obey, and care for human beings only when they wish to be caressed or fed. If punished, which, hypocritical and mischievous as they are, they deserve very often to be they express their resentment in the most violent manner, and place themselves at

at once on the defensive. They will sometimes follow their masters for a short distance, but for the most part they are entirely selfish, and if they have any attachments, they are rather to places than to persons. Their voracity causes them to be thievish, in the highest degree, and, although pampered and fed to the full, they never lose the propensity to steal. They are fond of being caressed, and when petted, will purr in token of their satisfaction; teased, they are ready at once to give battle; their common note is the well-known "miau," and the discordant squallings with which they disturb the neighborhood by night. They maintain a steady warfare with dogs, bristling their hair and elevating their backs and tails, and rolling their anger-flashing eyes. On the approach of one of the canine species, they place themselves in a posture of defense, snarling fiercely, and aiming to dart their claws into the intruder's eyes. The less spirited are soon vanquished, but one strong cat is a match for two dogs; and the female whilst nursing kittens is uncommonly fierce. Her young, of which she produces six or seven, are objects of the most extreme solicitude to her; she hides them carefully, lest they should be injured, carries them in her mouth from place to place, soothes or attracts them by a gentle purring, and plays with them as soon as they are able to walk, with apparent glee. At such times cats show themselves averse to music; if one nursing young kittens is in the room where there is any one singing or playing on a musical instrument, she will show her uneasiness by mewing around the musician, and, leaping up on his shoulder, place her paw on his mouth to stop it; this fact was once observed by the writer.

Cats are valued in the household on account of their

mice-catching qualities. They do not, however, pursue these sleek little plagues from hunger, but to gratify their own sanguinary propensities, and, perhaps, to please their masters, or from a love of cruel sport. Having caught a mouse, they will bring it forward, as if willing to exhibit their prowess, and then begin a most cruel sport, tormenting the poor creature for a long time before killing it. They are, however, in reality, no acquisition to the household, as they are troublesome, and of filthy habits. A little poison, or well-arranged trap, is a much more effective way of ridding the house of vermin. They will eat such food as is prepared for the family, but prefer meat and milk. In the neighborhood of woods they hunt hares and partridges for themselves; this being forbidden game where there are preserves, it is hindered by cutting off their ears, so that when creeping through the dewy grass, the moisture, entering the interior of the ear, gives them pain. They are extravagantly fond of the odor of catmint and valerian, both of which herbs have a powerful and transporting effect upon them, producing a species of intoxication; they run and rub themselves against it, will pass and repass, and roll over it, so often as to destroy it, or else scratch it up by the roots. But on the other hand they dislike rue exceedingly. Cats are fond of warmth, and have sometimes proved dangerous inmates, having set houses on fire by creeping into warm ashes and carrying fire among combustibles. They love to lie on the neck of persons, especially in winter, because they are warmed by the breath; many consider it dangerous for a cat to sleep with a child, as it is a vulgar belief that they suck the breath, and that infants have been killed by them. There are a great many fabulous stories relative to the injury

done by cats, such as that the hairs being accidentally swallowed, produces consumption, etc. They are, like dogs, subject to hydrophobia, but are much more rarely seized by it. Twelve or eighteen years are the limit of the age of the cat; their skins are very valuable to the furriers, who color and sell them as foreign peltry. The *Angora Cat*, with long silky hair, is, of all the foreign specimens, the best known. The tri-colored or tortoiseshell cat is also a favorite variety. It is the females only that are thus spotted with white, yellow, and black, and are often found as playthings in the drawing-rooms of rich ladies.

#### IV.—SEAL FAMILY. AMPHIBIA.

The Seal and Morse tribe, form the fourth and last division of the family of Carnivora. Their feet are so short, and so closely developed in the skin, that they serve them, when on land, rather for crawling than walking. The spaces between their fingers are filled up with a web; their bodies are elongated, like those of fishes, and their horizontally placed anterior extremities are transformed into a kind of fins; the hair is very short.

The genuine *Seal* or *Sea Dog* (phoca),  $\frac{4}{2}$ ,  $\frac{6}{4}$ ,  $\frac{2}{2}$ ,  $\frac{1}{10}$ ,  $\frac{1}{2}$ . Their head resembles that of a dog, and their large brown eyes peer out with a mingled expression of gentleness and cunning. These animals are susceptible of a kind of education, and are easily tamed, showing much affection for their masters, and performing many tricks at his command. They are found in all the northern seas of Europe, Asia, and America. Also, some species are natives of the Southern ocean, near the Pole, and in

those desolate regions where they abound, form the principal means of support to the dwellers there. The Greenlanders and Esquimaux live almost entirely upon their flesh and fat, and the train oil which is expressed from the latter serves not only for lighting their huts in the six months' darkness, but furnishes them with a costly drink. The sinews are converted into sewing thread; the intestines serve instead of glass, in the windows, as well as for sails, covering of tents, and water-proof shirts; the skin is made into garments, and sheathing for boats, sleighs, and houses; and from the bones are fashioned most of the household utensils. The taking of the various kinds of Cetacea forms, almost exclusively, the occupation of the Greenlanders, either surprising them as they are asleep on the land, and killing them with lances, or pursuing them when in the water. The fishermen, or rather seal hunters, embark in a light boat, and having come near one of these animals, dart a harpoon (barbed javelin) to which a rope, with a bladder on one end, is attached. This serves as a buoy, to show where the creature, if not mortally wounded, has dived, and thus the combat is easily renewed. The best known species are first,

The common *Sea Dog* (*phoca vitulina*), plate 13, fig. 7. In length from three to four feet, with brown hair, but on the ends, tipped with white and black spots. It is a lively, playful, and sagacious animal, and in spite of its unwieldy inefficiency in flying from man, is yet singularly acute. The female sea-dog has commonly two young ones at a birth, which she loves most tenderly, for when robbed of them, she will, it is said, shed tears like a human being. The old ones have a hoarse voice, but the cry of the young is a plaintive "oh, oh!" like that



of a human being who is being beaten. They live exclusively on fish.

The *Bonneted* or *Crested Seal* (*phoca cristata*). Eight feet long; black, with gray spots; head and feet entirely black; but, until the second year, it is white, with brown on the back. This species has a singular arrangement appended to the head. Under the skin of the forehead is a bellows-like cavity, which communicates with the nasal canal, so that the animal, by merely closing the nostrils, which it can do easily, is able to fill this balloon-like space in a moment with air. This it does to protect its head in combat with the hunters, whose blows generally are directed to that part. The club, however, takes no effect when falling on the inflated part, and by this wise provision of nature they often escape death. This animal inhabits Greenland, sleeps upon the ice, and when battling with an enemy, barks and howls like an angry dog; and, fighting with great fierceness, it will seize the huntsmen and bite them severely.

The *Sea Bear* (*phoca ursina*), is one of the largest species, and in common with others of the *phoca* tribe, is without ears; or else it has the power of concealing them, as there is no external indication of those appendages. From eight to nine feet in length, and eight centners in weight, an inhabitant of Kamschatka, he is possessed of uncommon strength, so that the pursuit of him is rather a dangerous one, as notwithstanding his unwieldy size and crawling gait, he moves with more swiftness than can well be imagined.

The *Sea Lion* or *Bottle-nosed Seal* (*phoca leonina*), is the largest of all the tribe, measuring twenty feet in length, and besides possessing the balloon apparatus already described as belonging to the Crested Seal, has a

proboscis, or kind of thick comb or trunk, hanging from the under jaw ; his skin is brown. These animals are found on the coasts of the southern extremities of America, and the neighboring islands northward toward Chili. They are of a drowsy nature, and delight to roll and sleep in the mire. They are, however, very wary, and always place sentinels near the place where they sleep, to give the alarm if hunters approach, which they do by uttering a frightful bellow. The males often fight desperately with each other. They feed on all kinds of marine animals, together with aquatic plants. The female (in July) brings forth but one young seal at a birth ; the cub is from four to five feet long, and weighs seventy pounds. The flesh is bad, the tongue only being edible. The skin is useful in the manufacture of trunks, etc., and from the blubber, which is found in a layer nearly a foot thick, between the skin and flesh, a most superior oil is extracted.

The *Walrus*. There is only one species of this race ; the *Walrus* (*trichechus rosmarus*), plate 13, fig. 8,  $\frac{2}{3}$ ,  $\frac{2}{3}$ ,  $\frac{2}{3}$ . The upper corner teeth project like large tusks, and give to the animal a singularly odd appearance. The walrus is mostly from eight to ten feet in length ; sometimes, however, he is found reaching to twenty. The thickness of the body is about the same as that of a horse. The skin is silver gray, verging on a dirty yellow ; and the weight varies from fifteen hundred to two thousand pounds. The mouth in front is broad, like that of an ox, and garnished with bristles nearly as coarse and thick as straws. The tusks measure three feet in length, are of four or five pounds in weight, and are more valuable than ivory, as they are not so yellow. The food of the walrus consists of fish, crabs, sea grass, etc., and although

most numerous in the northern polar seas, they are also found in the Southern ocean.

In the hyperborean regions these animals assemble in large droves upon the ice-fields, where they sleep like swine, lying close to one another, and snoring loudly. Some, however, are always on the watch; on the approach of danger these sentinels awaken those next them with a stroke from their teeth, and the alarm is thus quietly and gradually communicated. On their being aroused, they rise up, strike upon the ice with their long tusks, and bellow so loudly that the noise can be heard a mile off. The walruses are killed in great numbers; sometimes, like the whale, with harpoons, but are often shot. The skin is used, being indestructible, in harness making; the tusks bring a higher price than those of the elephant; and, last of all, the fat, which, when fresh, is extremely palatable and sweet as marrow, is prized as an article of food; and even when it becomes rancid, as it soon does, is scarcely less valuable in the capacity of train oil. A single walrus furnishes blubber enough to make from two to three barrels of oil. The flesh, coarse and black, is seldom eaten; the tongue, however, when fresh, is said to be very good. The walruses sometimes follow boats; in such case, if permitted to come too near, they are dangerous neighbors to the hunters on account of their formidable tusks, with which they will not only attack them most fiercely, but tear off the sheathing of the boat so as to place it in a sinking condition.

## FOURTH ORDER.

## MARSUPIALIA.—OPOSSUM.

The Marsupialia or pouched animals are distinguished from all others by most of the females of this class possessing a pouch-like appendage, that, attached to the lower surface of their bodies, serves to lodge their young, (which, at the time of their birth, are very imperfectly developed) during the period of being suckled. This envelope can be firmly closed.

The first of our description shall be the *Opossums* (didelphis),  $\frac{1}{8}$ ,  $\frac{2}{2}$ ,  $\frac{1}{4}$ . They are found in America, and are nocturnal animals, feeding on insects, birds, eggs, and fruit; fresh blood is, however, their favorite article of diet; therefore they frequent the neighborhood of poultry-yards, where they so intoxicate themselves with blood, that they are often found sleeping under the dead body of the victim. They live without companionship or regular homes, are slow, dull, and sleepy, sometimes, although with much trouble, climbing trees, in which effort they are assisted by their prehensile tails. They bear a great resemblance to rats, in the pointed shape of the head and wide-spreading jaws. The number of young brought forth by the female opossum, annually, is, from eight to fourteen. These are nursed in the pouch for fifty days, and while thus imprisoned, are difficult to be seen. Unlike most other animals, the opossum is not useful, for neither his skin or flesh\* (on account of its unpleasant odor) are turned to good purpose, and he can not be tamed.

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\* This unpleasant odor exists only in the skin. Deprived of this, many use the flesh.—*Tr.*

The most remarkable of this class are the following :

The *Common Opossum* (*Didelphis marsupialis*), dwells in Brazil, is about the size of a rabbit, with a pointed, black muzzle ; its color is dark brown, and when irritated it will bite severely like a rat.

The *Surinam Aeneas* (*Didelphis dorsigera*), plate 9, fig. 1. About the size of the marmot, is of a grayish yellow color, except round the eyes, where it is brown ; this little animal, having no pouch, carries its young, when they are somewhat grown, upon its back ; the little ones, thus mounted, wrap their prehensile tails round that of their mother, and present a very singular appearance.

The *Pouched Martens* (*Dasyurus*),  $\frac{8}{6}$ ,  $\frac{2}{2}$ ,  $1\frac{2}{2}$ , are fox-like, wandering animals, with sharp-pointed muzzles and bushy tails. They are natives of New Holland, where they live in the crevices of rocks and hollow trees, from whence they issue at night, in search of food ; this consists mostly of the flesh of animals lately killed, but they will also feed upon carrion. The best known of this species is the *Bear-like Marten* (*Dasyurus ursinus*), which is eighteen inches long, with a rough, black, hairy hide and large whiskers. These creatures very much resemble young bears, are very ravenous after meat, and their teeth are so sharp that they can bite the strongest bone in two. They sit upright while eating, and, like squirrels, feed themselves with the fore paws. Their flesh is said to be palatable ; they, however, are not easily tamed.

#### HERBIVOROUS MARSUPIALIA.

The *Kangaroo* (*Macropus*),  $\frac{2}{2}$ ,  $\frac{0}{0}$ ,  $1\frac{0}{0}$ . The kangaroos are the largest animals found in New Holland, and

feed entirely on plants. They are remarkable for the length of their hind legs and strong tail, which serves as a fifth foot; the fore-paws are uncommonly small. They seldom walk on all fours; their usual gait is a leap accomplished by means of their hind feet, in which the tail is an able assistant; they often clear a space of twenty feet at a single bound, and leap over bushes six or seven feet high with such facility and swiftness that the nimblest grey-hound is unable to follow them. They are much hunted in New Holland, as their skins are valuable and their flesh edible. When in close quarters with the dogs, they know how to defend themselves by wounding the antagonist in the tenderest parts with their sharp claws, biting severely, or striking with their strong tails, which they are able to use with sufficient force to break a limb. As the kangaroo, at least those of the larger species (*halmaturus giganteus*), plate 9, fig. 4, is mostly six feet high, he often, when pursued, flies to a neighboring pool, in which he can walk upright, while the pursuing dogs are obliged to swim; catching his enemy with his fore-feet, he holds him under the water and drowns him. Taken young, the kangaroo is easily tamed, and has been transplanted into Europe. The female produces four or five at a birth, which she nurses with the utmost tenderness, concealing them, on the approach of the slightest danger, in her singular pouch.

There are other Marsupialia, such as the *Phalangerys*, which much resembles the flying squirrel and opossum; they are found principally in New Holland.



## FIFTH ORDER.

## RODENTIA OR GNAWERS.

## RATS.—MICE.—SQUIRRELS.

The Rodentia or Gnawers are distinguished from all other unguiculate mammals without pouches principally by their teeth. The canine teeth are wanting; the incisors, however, of which they have two in each jaw, are very large, and remarkable for their strength, arched form, and lozenge shape of their cutting edge. These points, being very sharp, serve them to reduce hard substances to very delicate particles. The peculiar conformation of the jaws preventing the admission of large mouthfuls, the rodentia are necessarily obliged to file, as it were, all their food, preparatory to swallowing. These teeth, like the nails, have the peculiarity of always growing, so that, however they may be worn off by constant use, they never become less than at first. If through any accident, one of these teeth is lost, the opposing tooth continues to grow throughout the life of the animal, there being no longer any friction to keep it within limits. The hind paws of all the gnawers are more strongly developed than the fore, and, therefore, serve rather for leaping than walking. The jerboa and kangaroo afford the best examples of this arrangement. The toes are separated and provided with hooked nails; the anterior extremities are composed of four fingers, but the thumb is mostly wanting. The head is pointed, the lips and jaws furnished with long whiskers; the eyes are proportionally large, but dull and staring. They live mostly on plants. From their propensity to gnaw

everything, as well as their voracity, they are considered as real scourges, on account of the damage they occasion. A few of the species only are useful for the sake of their skins and palatable flesh. They are found all over the world, and some varieties pass the winter in a deep, lethargic sleep.

Large-tailed *Fox Squirrel* (*sciurus rubicaudatus*), Audubon. The general color of the fox squirrel is mixed, gray and black above, and reddish yellow below; the hairs on the back are bluish black, at the base broadly ringed with brown, more narrowly with black, then with grayish white. One remarkable feature in this species is, that the bones are tinged with red. Audubon and Bachman in their "Quadrupeds of America," make two species of it. The fox squirrel, although found in the heavily-timbered districts of Illinois, is more properly an inhabitant of the timber of the prairie regions, and its favorite habitat is in the "oak openings" of Wisconsin and Michigan and the groves that skirt the streams watering the prairies of Illinois. The fox squirrel is very lively and of elegant proportions; therefore he is conspicuous among the rodents, not only on account of his beauty, but his interesting habits.

The *Migratory* or *Common Gray and Black Squirrel* (*sciurus migratorius*), Audubon and Bachman. About 12 inches in length; tail,  $10\frac{1}{2}$  inches. There are two varieties. One is a blackish brown on the upper parts, lighter beneath, and with some rusty markings on the face and feet. The other is of a gray color, with reddish yellow markings about the head, sides, and feet. They are, however, really the same, as observation has shown that the same female is the parent of each. The most interesting feature in the habits of this animal is

the remarkable migrations performed at times by large bodies of them, and although they swim with difficulty, they manage to cross broad rivers like the Niagara and Ohio, though many are drowned in the attempt. Acorns, nuts, and the berries of the black haw (*viburnum lentaga*) are their usual food, although they do not scruple to steal corn when they can get at it.

*Black Squirrel* (*sciurus niger*), Linnæus. Considered by some naturalists as a variety of the migratory squirrel. Its food and habits are the same. Finds its home in all the Middle States.

*Southern Gray* or *Carolina Squirrel* (*sciurus carolinensis*), Gmelin. Size somewhat smaller than the above-described. It is of a rusty gray color above, white below, the feet and face rufous. Some hunters call it the *Silver Gray Squirrel*. Food and habits the same as that of the last two species.

*Little Red Squirrel* (*sciurus hudsonius*), Pennart. Length  $8\frac{1}{4}$  inches, vertebræ of tail  $5\frac{1}{2}$  inches; back light grayish brown, with a dorsal stripe of bright reddish brown; under parts of head and body pure white. This pretty and active little animal is well known through the Northern States under the names of *Red Squirrel*, *Chickaree*, *Pine Squirrel*, and sometimes *Mountain Squirrel*. Found everywhere throughout the Middle States, and, according to Audubon, as far south as North Carolina. Its natural home is in heavy timber, and it sometimes but not generally, lives in holes in the ground.

*Striped Ground Squirrel*, or *Chipmuck* (*tamias striatus*), Linn. The *Prairie Squirrels*, or *Spermophilus*, compose a different genus, for their true home is on the prairie, where they replace the arboreal. The

form of these squirrels is adapted only to locomotion on the ground. The body is thick and heavy, with short legs, and in place of the long toes and sharp, hooked nails by which the arboreal squirrels cling to the trees so readily, they have shorter toes, with longer and straighter nails, for digging burrows in the earth. The long, flexible, and bushy tails, which aid the squirrels in their bold leaps, and keep them warm in winter, would here be useless, and soon worn ragged by dragging through their burrows. They have cheek-pouches in which to carry food; and two species, at least, convey roots and seeds to their burrows to be eaten. The peculiar state of torpor in which these, as well as some other rodents, as well as a few carnivorous mammals, pass the winter, is an admirable provision in the economy of nature. At the approach of severe cold, the prairie squirrels retire to their burrows, curl themselves up with the head against the abdomen, and fall into a state of torpor from which they do not awaken until the spring. In this state they take no nourishment, nor do they move. There are several species. *Striped* and *Spotted Prairie Squirrels* (*spermophilus*), called in Iowa, Wisconsin and Northern Illinois *Gopher* (*pseudostoma bursarius*), resembles the *Common Chipmuck*. The German farmers call it the *Fence Mouse*. The food of the *Striped Spermophile* is grass, seed, mice, and insects.

*Gray Prairie Squirrel* (*spermophilus franklinii*), Sabine, also called *Gray Gopher*, is about ten inches long, tail five. The back is light brown, dotted thickly with black; under surface is grayish white. This species is gregarious, and live together in large companies. Found in great numbers throughout the prairie regions of Wisconsin, Illinois, Iowa, and Southern Minnesota.

Food the same as the striped spermophile (*spermophilus tuderim lineatus*).

The *Prairie Dog* (*spermophilus ludavicanus*), Ord. Length of male 13 inches, vertebræ of tail  $2\frac{5}{8}$  inches. Back reddish brown, mixed with gray and black; under surface soiled white; tail banded with brown.

The famous *Prairie Dog*, or *Prairie Squirrel* exists in great abundance on the plains west of the Missouri river, and, like the gray spermophile and woodchuck (*arctomys morax*) is strictly a prairie animal, subsisting upon plants, and probably some insects. The prairie dogs are fond of each other's company, and live together in large congregations, their numerous burrows placed close together, being called dog-towns. Its note bears some resemblance to the bark of a dog, and thus it has gained its name.

Numbers of the common prairie rattle-snakes (*crota-  
lophorus tergimanus*) as well as of a small owl, live habitually in the burrows of the prairie dog. These can hardly be welcome guests, as, although the former feeds chiefly on insects, it might devour the young; and the rattlesnake certainly does, as well as make many a meal of the adults.

The *Squirrel* (*scuirus*),  $\frac{2}{2}$ ,  $\frac{0}{0}$ ,  $\frac{1.0}{8}$ , has no thumb on the fore foot; the ears are very large, and ornamented with tufts of long hair; the tail is bushy. To this class belong, first, the *Common Squirrel* (*scuirus vulgaris*), plate 9, fig. 2. It is of a bright brown color, inclining to red; some are black; the breast and under surface of the body is white. In northern regions, during the winter, this coat changes to a beautiful bluish gray; it is nine inches in length, and its spreading plume-shaped tail, ten. The squirrel is found all over Europe and in middle

Asia. It is a beautiful little animal, full of life and grace, and constantly in motion. It springs from tree to tree with incredible agility, climbing or bounding up and down among the branches, where, in intervals of rest, he sits polishing his fur, like an ape. Holding itself upright, or, rather, seated on its hind legs, it elevates its feathery tail, and spreads it like a canopy over its head; it conveys its food to its mouth with its forepaws, nibbling and biting off such parts as are pleasing to its palate, and throwing the refuse, such as nutshells, apple-skins, etc., on the ground. The favorite articles of food are kernels of nuts, acorns, pine seed, beech or chestnuts, and sweet fruits, such as pears or apples.

Squirrels are quite easily tamed, and can be taught many amusing tricks; but those who play with them must not trust them too far, as they sometimes bite fiercely; and it is necessary to confine them by a chain or in a cage, as they will gnaw at every thing they find in their way. In the forests they build nests in many trees, living only in one as a home, but on the approach of danger they will leave it, and go to another; but sometimes, when pressed, they will take possession of a deserted magpie's nest. Three or four young squirrels, sometimes seven, are brought into the world at a birth, which in four weeks from that time are able to climb trees with the old ones. They remain hidden in their nests during the winter season, but do not maintain a dormant sleep, and feed upon the store of acorns, beech nuts, etc., which, gathered during the summer months, they have laid up in their storehouses. In very severe winters, sometimes the stock of provisions does not hold out; it then goes hardly with the poor little creatures; they freeze or starve, and in spring are often found dead.



The gray *Siberian* squirrels are much sought after on account of their beautiful pelage. In Europe and America the squirrel is shot, partly as game, partly as a nuisance, his flesh being well-tasted, and land-holders believing him injurious to young timber. It is said that when these animals are obliged to cross a stream, they avail themselves of a piece of bark for a boat, and use the tail as a sail or rudder; but this is hardly credible. In North America there is one species which is always gray, and in the East Indies one which is as large as a cat, and very black; this last-named is very fond of the milk of the cocoa-nut, and is easily tamed.

The *Flying Squirrel* (*sciurus volans*), plate 9, fig. 3, has a prolongation of skin, which, extending along the sides of the body, unites the fore and hind legs, and forms a kind of parachute, which, as in the *Cheiroptera*, assists them to fly. These animals are about as large as a rat; on the back they are of an ashen gray color, on the under surface of the body white. They live in the birch-woods of Siberia, Poland and Lithuania, and one species is found in North America. The flying-squirrel is seldom seen on the earth; it makes its nest of moss in hollow trees, where it sleeps by day, coming forth only at night. It is said that it can leap over a space of twenty fathoms wide, at a single spring. It feeds upon buds, sprouts, and catkins of the birch, together with all kinds of berries and seeds. Its skin is worthless.

The *Marmots* (*arctomys*),  $\frac{2}{2}$ ,  $\frac{n}{n}$ ,  $\frac{1^o}{8}$ , are distinguished by their broad, flat heads, heavy and coarse-haired bodies, cheek-pouches, small tails and short stout legs. They dig holes in the earth, to which they retreat in winter, a season which they pass in profound lethargy.

To this class belongs the *Common Marmot* (*arctomys*

marmota), plate 9, fig. 10, which is about the same size as a rabbit, with a coat of yellowish gray, with ash-colored spots towards the head, and the lower surface of the body reddish brown. These animals inhabit the regions bounded by eternal snows, and abound in the Swiss Alps, Tyrol, Corinthia and Styria. They are very timid and harmless, living on grass and other herbs. At the approach of danger, or on hearing a sharp whistle, they roll themselves into a ball, and seem lifeless; therefore it is difficult to shoot them. They dig holes twelve feet deep to serve for their winters' lodging, at the further end of which is a large cavity or apartment which they line thickly with hay and moss. In October they close the outward passage, and the whole family, assembling in the common nest, prepare for an eight months' sleep. Whilst in this lethargic state, they breathe but fifteen times in an hour; the heat of the body falls to fifteen degrees, but if brought into a warm room the breathing becomes more distinct, the pulse rises, and after snoring and gaping, the animal at length is fully awakened. During the time of this long winter's sleep, they are sustained by the fat of their own bodies, but by degrees this is consumed, and in spring they are remarkably meager. They are easily tamed, and feed on the same food as do squirrels; sitting in an upright posture, they convey it to the mouth with the fore paws. They are taught to dance, walk on a pole, and perform many monkey-tricks at the command of their master. In winter they sleep all the time in a room where there is no fire; but if the cold becomes very intense, they wake up. Their flesh is eaten, and considered palatable. There is a variety found in Poland which is called the *Bobak*.

Much smaller, but more prized on account of its beau-

tiful skin, is the *Zizel* or *Casan Marmot* (*arctomys cicillus*). It is about the size of the hamster (*German Marmot*), is of a brown color, spotted and striped with white, and has cheek-pouches, like the monkey. Its manner of life is like that of the marmot, and its home is in Russia, Poland, and Siberia. It becomes uncommonly tame, even if old when captured, and very soon attaches itself to human beings. The flesh is eaten.

The *Woodchuck* or *Ground Hog* (*arctomys monax*)—Linn—is about eighteen inches in length, from the nose to the tip of the tail, with the vertebræ and tail four inches. The tail is bushy, but small; the ears and legs short; the body thick and heavy; weighs nine or ten pounds. The usual color of the back is grizzly brown, with the head, and tail, and feet darker; the under surface reddish. The woodchuck is familiar to all the farmers of the Middle States. It is abundant on the Missouri river, and exists westward to the Rocky mountains. Northward it is found as far as Hudson's Bay. It is an inhabitant of the woods; digs its burrow under a log, brush-heap, or fence, or among rocks, and particularly delights in rocky bluffs. It is fond of peas, clover, etc.; is strictly herbivorous. It hibernates like the squirrel, to which family it belongs, and its sleep is very profound. The fur is of no value, but the dressed hide is very tough, and highly esteemed by the backwoodsmen for making whip-lashes, money pouches, and various other articles of use.

The *Dormice* (*myoxes*),  $\frac{1}{1}$ ,  $\frac{0}{6}$ ,  $\frac{8}{8}$ . The most remarkable of this species is the common *Dormouse* (*myoxis glis*), or *Fat Dormouse*, which is about the size of a rat. The upper surface of the body is a grayish brown—the lower white; inhabits the southern parts of Europe. It

greatly resembles the squirrel in its habits and appearance, but is not so agile in leaping, as the hind legs are shorter. It lives in the great forests of oak and beech, and constructs a retreat in the hollows of rocks and trees, which it lines with moss. Here, after storing up some provision, it sleeps throughout the winter or seven months; hence by many it is called the *Seven Sleeper*. It is considered good eating, and the old Romans raised and fattened this species as a table delicacy. There are two other races belonging to this family—the *Garden Dormouse* (*myoxus nitela*), about the size of the common rat, and a smaller—(*myoxus avellanarius*)—which much resembles the domestic mouse.

In America there are several species of mice (*echymis*), which, like the hedgehog, are distinguished for having sharp prickles among the hairs.

The *Naked-tailed Mice*,  $\frac{2}{2}$ ,  $\frac{0}{0}$ ,  $\frac{6}{6}$ , are very destructive, not only on account of the voracity with which they devour all eatables, but their uncommon increase. Their tails, long and thin, are covered with minute dusky scales, thickly interspersed with short hairs. To this class belongs

The *Common Mouse* (*mus musculus*), scarcely three inches long, with a tail of equal measure. Their coat, on the upper surface of the body, is dark gray; on the lower, whitish. Mice are pretty little animals, that play and run around most gracefully. The skin is sleek and soft; eyes bright and lively. All the limbs are formed with perfect delicacy, and their motions are rapid and active. Seated on their hind feet, they seem to observe all that is going on around them, and, although very timid, they may be taught to become so familiar as to eat out of the hand of their master, and creep in and out of

his pocket. One species, which are white, with red eyes, become particularly tame; they can be taught many tricks. They multiply very rapidly—from four to six is the usual increase—and one mouse family can perpetrate an astonishing amount of mischief. The young have very large heads, and being without hair, the skin is so transparent that the beating of the heart and movement of the lungs (one hundred and fifty respirations in a minute) can be discerned. The ears are closed from the time of birth until the sixth day; on the seventh the natural covering of the skin is visible, and on the thirteenth they open their eyes to the light. An eternal war is waged against mice by means of poison, traps, and cats; and although constantly being destroyed, they are never exterminated. They can not bear the odor of turpentine; therefore, to place rags, saturated with oil of turpentine, in closets infested by them, will be found effective in driving them from thence. The best bait to allure these little pests is hempseed, and the most proper poison is the well known phosphorus, or arsenic mixed with sugar and corn meal, and made into a cake.\*

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\* *Musk Rat* (*fiber zebethecus*)—Linn. The musk rat or *Musquash* is about fifteen inches in length, with a tail ten inches. The body is heavy, eyes small, ears concealed, and incisor teeth large; legs short; hind feet with toes flat, and nearly palmated. The long hair is of an ashy brown color, very soft and warm. It is at present used for making caps, gloves, and some articles of ladies' furs. It is strictly aquatic, and naturally seeks its food in the water. The Potawattomie Indians call the muskrat *Shush-ko*. They eat the flesh when boiled with corn, or roasted or cooked in various ways. The hunters and trappers consider the hind quarters very palatable when roasted on coals, and they, as well as the Indians, esteem the tail a great delicacy. Found every where in America.

*Meadow Mice* (*arvicola*). There are several species of this genus found in the United States—all alike mischievous and pests to the

The *Field Mouse* (*mus sylvaticus*), is gray brown; about four inches in length, and is much more destructive than the domestic mouse, as in warm seasons, in the space of a year, their increase is so immense (calculated by millions) that they undermine whole fields, and waste or devour half the harvest. They dig long and broad galleries in new sown fields, which communicate with cells, where they lay up their winter stores. The turning of swine into the fields after harvest is an efficacious remedy, but it can not always be practiced where the fields lie far apart, and to lay poison about is hurtful, as useful birds and animals are killed by it. There remains, therefore, no better way to get rid of these ravagers than by placing traps for them and setting a price on their heads. The moles and hedgehogs are their decided enemies, and, on that account, ought to be protected rather than hunted and destroyed.

The *Rat* (*mus rattus*), is nearly a span long. The upper part of the body is a blackish gray; the lower a lighter shade of the same or ash color. Their food consists of every thing eatable. They are not, like mice, timid and fearful, but bold and impudent, ranging every where, and gnawing every thing, and carrying off the

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farmer. They are hunted by the larger *Garter Snake* (*eutamias sirtalis*), and the carnivorous mammals. Minks, skunks, foxes, and prairie wolves dig open their burrows and feed upon them. Badgers also destroy many. The *Common White-footed Wood Mouse* (*mus leucopus*)—Rafinesque, *White-footed Prairie Mouse* (*mus bairdii*), *Long-tailed Jumping Mouse* (*jaculus labrædoriosus*), *Prairie Meadow Mouse* (*arvicola austeris*)—Le Conte, *Long-haired Meadow Mouse* (*arvicola riparius*), and the *Wood Meadow Mouse* (*arvicola scalopsides*)—the smallest of all rodents, but the most pugnacious—are found in Northern Illinois and Southern Wisconsin, and much resemble each other in their general habits, although some are more arboreal than others.—*Tr.*



fragments in order to make their nests. They kill young birds and rabbits, and, it is said, will even eat pieces from live hogs which are too fat to move. When shut up and straitened for provisions, they will devour each other. A merchant had, in his warehouse, an old cheese cask, which, after being emptied, stood unremarked in a corner, a number of bales of goods placed before it concealing it from observation. Six weeks perhaps had passed, when, having occasion to clear out the warehouse, and coming to the above mentioned pile of goods, the old cask was found, and singular movements were heard proceeding from within. A light was let down, and disclosed three enormous rats, which were at once killed. The hogshead was emptied, and besides the three fat, well-fed rats, were found thirty tails, the remains of those on whose bodies they had feasted. Attracted by the smell of the cheese, they leaped into the barrel, which they could easily do; getting out, however, was another matter, as the sides were steep and slippery. Rats are mostly caught in traps, baited with fat bacon or cheese. Driven into close quarters, rats will turn on their pursuers and bite furiously. Sometimes the tails of young rats grow together, a species of deformity which obtains for the object the title of the Rat King. Rats are very kind to the old of their own species, and the young have often been observed carrying food to the old and blind.

The *Surmulot* or *Brown Rat* (*mus decumanus*), Wandering, Pallas—is much larger than the common rat, ten inches in length, its coat is reddish brown, the lower surface of the body is whitish. It was not known in Europe until the eighteenth century, when some vessels brought it from Persia. It is remarkably strong, bold, and dar-

ing, and bringing forth a dozen of young three times a year, the increase is astonishingly great. They make long journeys, and can be seen passing over rivers and plains in large troops. It is now nearly the only species of rat known by that name, since it has driven all others away. The habits are like those already described, and the modes of extirpation or capture the same.

The *Jerboa*, *Jumping Mouse* (dipus). This is an animal with long hind legs, which, like the kangaroo, it uses in leaping. It receives its name of jumping mouse because in moving from place to place it does not walk, but bounds about, jumping over a space of four or five feet. It lives in burrows, is a native of Asia and Africa, and sleeps during winter without nutriment. The most noteworthy of this tribe is the *Jerboa* (dipus jaculus), plate 9, fig. 5. These animals, which are about the size of a squirrel in length, but higher on account of the long hindlegs, are found in southern Russia. They leap with such ease and swiftness that they can scarcely be observed to touch the ground, and can not be overtaken even by hunters on horseback. When pursued, they double and wind their course, like hares, and, while flying, stretch out their tails to full length. This, provided with a tufted tassel of hair flying in the wind, gives them a most graceful appearance. They live in families, and subsist upon mice.

The *Hamster* (cricetus),  $\frac{2}{2}$ ,  $\frac{0}{0}$ ,  $\frac{6}{6}$ , also called the German marmot, is larger than a rat, of a reddish gray above, and black beneath, with white feet; some are quite black. The hamster is one of the most pernicious rats that exists. It is found in the north and middle of Germany, Siberia, and Russia, where it digs for itself a subterranean burrow, very ingeniously arranged, and

after the following manner. In the middle is a small cavity, where it sleeps; this is surrounded by another, which serves as a magazine for winter stores, two passages lead to the middle chamber, one of which is oblique, the other perpendicular. The former is used as the common passage for going out and in and carrying off the husks and other matters which they do not use; the perpendicular gallery serves them to make a speedy retreat when pursued. The nest or sleeping-place is lined with chaff or soft straw, and the magazine is well stored with dry clover, corn, and other grain. These receptacles, flat below, and arched above, are capable of holding from ten to twelve pounds of corn. Another small cavity near the oblique passage is the reservoir for all the refuse. This burrow is at least four feet below the surface of the earth. The male and female have separate abodes; that of the female is deeper and has many perpendicular holes, by which the young ones may come in and go out. The hamster is an ill-natured and selfish animal, and without any social qualities; in the spring prepares his burrow, into which none of his species are ever admitted during the summer, but his mate. In the autumn when he has filled his magazine, he drives her out, together with the young ones, so that they are forced in all haste to dig a burrow for themselves and gather such stores as they can find. As he is thus an inveterate tyrant in his own family, so is he the most ferocious enemy of every animal that comes in his way. If, when pursued, he finds he can not escape, he is ready at once to engage with men and dogs in desperate fight. Raising himself on his hind legs, he darts upon the enemy, caring neither for the magnitude of the horse or address of the dog, and never lets go his hold until he is

killed ; and so great is his rage and fierce his attack that he will seize upon a stick held up before him, and bite into it so firmly that he can be held up by it. In summer he feeds upon different vegetables, which he does not store away. In harvest, however, the work of collecting begins. He bites the ripe grains of the wheat or barley fields from the straw, stows the grains into his enormous cheek pouches, each of which will hold a hundred barley corns, and carries them to his magazine ; there he empties his pouches, using his feet for the purpose, and sallies forth after a new supply. This work is carried on most industriously both by day and by night. If he is surprised, when his pouches are full, by seeing an enemy at a distance, he begins to empty them by scratching out the grains with his feet, and prepares for battle. The hamster does not live entirely on cereals, but catches beetles and mice, which, after first biting on the head, he eats, with the exception of the skin. Each kind of grain is stored away separately, and so provident and particular is the hamster, that he bites off the germ end, lest it should sprout during the winter, towards which time he eats voraciously until he falls asleep. In March he awakes, after which, for several hours, he remains very drowsy. The increase is extremely rapid, averaging from four to sixteen twice a year, in one family ; and, as it has been computed that each one carries off twelve pounds of grain, some idea may be formed of the damage they occasion in fifty days, their usual time for collecting, during which they are found in thousands.\*

In late harvest the hunt commences. It is by no

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\* In one year eleven thousand skins, in another fifty-four thousand, and in a third thirty thousand were exhibited at the town hall of

means a trifling undertaking, as the most usual way of taking them is to dig them out; and many an old hamster is bold enough to leap out of his burrow and attack the spadesman. When the purpose is effected successfully, the digger is rewarded for his pains by the quantity of stores he finds. The hamster, although he might deserve praise for the industry, order, and cleanliness, with which his dwelling is arranged, is, nevertheless, a hateful animal; for he is the living likeness of impatience, hatred, fool-hardy rage, and avarice, and, like the miser, although he is unable to consume all that he has gathered, he never shares with any of his kind. The only use that can be made of him is his skin, which the furriers use for lining.

The *Water Rat* (*mus amphibius*) is a little animal about the size of a common rat, of a dark gray color, with a round head, broad nose, and short tail. It lives in northern Asia, Europe, and North America, and digs its burrow in the neighborhood of rivers or ponds, to which galleries or tunnels often lead of a hundred feet in depth. It swims with great facility, and runs around with equal ease on the bottom of the channel, eating crabs, larvæ, tadpoles, and little fish. It is very injurious to meadows, fields and forests, as it destroys the roots of grass, gnaws the bark from young trees, and also devours cabbages and young fruit.

The *Lemming* (*mus lemmus*), or *Lapland Marmot*, is nearly as large as a rat, with very short ears and tail; the fore feet are provided with sharp claws suited for digging; the color is a variegated black and tawny yellow. It is a native of Norway, Lapland, and Siberia,

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Gotha, as vouchers for the bearers to receive the reward fixed on their heads.—*Tr.*

and increases more rapidly than any other animal. The most remarkable feature of these lemmings are their wanderings. In autumn they assemble in large troops, and move forward in a straight line of two or three spans in breadth, looking like an animated torrent. Still holding their onward march, they devour whatever grass or herbs they find in their way. The females are easily distinguished from the males by carrying one of the young ones in her mouth, and the others upon her back. If they are interrupted in their course, they never turn either to the right or left, and although for the most part timid, will fly upon their opponents, and fastening upon whatever obstructs their way, do not easily quit their hold. If they meet with a stack of hay or corn, which interrupts their passage, instead of going over or around it, they eat their way through; round a rock they make a semicircle; and if a lake or river is to be crossed and a boat intercepts their way, they mount directly up its sides, and the living torrent passes over it, straight into the water. In short, their course is to be a direct one, and in spite of every obstacle they pursue it. They always march towards the sea, but few of those who first set out ever reach it. In the spring they may be seen returning, but in greatly diminished numbers. Although this singular habit has given rise to many conjectures, no opinion can be formed as to why they thus wander. Anticipations of the coming winter, or want of food, can not be the cause of these migrations, and men, when they can not trace effects to natural causes, are very apt to attribute them to supernatural. The common people believe that, because they come in such droves, they fall from heaven with the rain; be this as it may, they are unwelcome visitors, as, like all mice, they do great mis-



chief to the fields, and the only good which results from their visits is that bears, foxes, gluttons and martens follow and prey upon them, and thus, coming within easy reach of the huntsmen, their skins promise a profitable trade to those who deal in peltries. The *Blind Mouse* (*mus typhlus*) is only remarkable as being entirely blind, because its eyes, barely as large as the head of a pin, are covered by the skin which is drawn over them. It is about the size of a common rat, has a square-shaped head, and is an ugly animal; in its habits it much resembles the mole; it finds a home in southern Russia, Poland, Lesser Asia, Syria, and Persia.

Our next step is to consider the larger tribes of the class Rodentia, the most important of which, the *Beaver* (*castor fiber*), plate 13, fig. 6, is distinguished from all others of its class by its horizontally flattened tail, which is covered with scales. The feet are furnished with five toes, which are united by a web, the hind ones being palmated. These animals have two glands or pouches situated in the posterior portion of the body, which contain a fluid exudation of a strong nauseous odor, which is sold by the apothecaries, and called *castoreum*. The beaver is about the same size as a badger, of a reddish brown color; the scaly tail is gray, sometimes black, and the smooth, gnawing teeth are yellow. It is found in every country in Europe, in northern Asia, and North America, and, passing the greater part of its life in the water, it is an excellent swimmer and diver. The skill of the beavers in building their habitation, when left undisturbed, is most ingenious, and has rendered them famous. They select a situation for their burrows on some brook or river where the water is rapid, and where such food as they prefer is found in plenty; the next

step is to commence a dam or dike to maintain the water at an equal height, or on a level with the lowest story of their abode, which always consists of two stories. This dam is formed of wood. They then choose trees about the size of a man's arm or leg, and set about cutting them down, which they do without any instrument but their teeth. Having separated them into blocks, from which they gnaw the bark, they place these in the water, interlacing them with branches, filling up the intervals between them with the fragmentary pieces of wood, and plastering the whole over with a thick coating of mud. This dam is shelving, being twelve feet thick below, and only two above, the side next the water being oblique, and the other steep or perpendicular, it is so solid that a man can walk upon it. Against this wall or dam, or on the bank of an island, they build their huts, which are mostly of an oval shape, and project two thirds over the water. These fabrics are perpendicular and vaulted, like a dome; have an opening below, so that the ice may not be blocked up; both inside and outside they are plastered with a mortar made of clay and grass, in the laying on which it is said they use their tails as trowels. Each of these beaver cabins occupies a space of five square feet, and serves to accommodate from fifteen to twenty beavers; and each hut has an upper story, to which they retreat when the waters rise. If they are disturbed in this work, they forsake it, and make their burrows in the bank, from which they dig tunnels leading into the water. These cabins are by no means isolated, but are clustered in hamlets—if we may so term them—where a community of beaver families dwell, so that in this little republic, on the river bank, several hundreds may be found.

Their food, in winter, consists of different kinds of barks, but in summer they live on grass, fruits, plants, and roots. Six or eight young ones mostly form the addition to each family. These gentle creatures are easily tamed, and will follow their owner about like dogs, and obey his call. Their teeth are so sharp and strong that they can gnaw through a tree about the thickness of a man's arm with great facility. They are hunted from November to April, and are taken mostly in traps baited with a poplar branch. The fur is much sought after, as the well-known castor hats are made of it. The castoreum of the Siberian beaver brings a higher price than the Canadian, being considered to possess higher medical qualities. The flesh, and especially the tail, is considered a dainty, and is used in Lent.

The *Porcupine* (*histrion cristata*), plate 9, fig. 11,  $\frac{2}{3}$ ,  $\frac{0}{0}$ ,  $\frac{a}{a}$ , is recognized at the first glance by the stiff and pointed quills with which their bodies are armed; their tongues are also covered with prickles, and they have strong claws, well adapted for digging. They are natives of the southern coasts of the Mediterranean, Spain, Sicily, Calabria, and Africa. This animal excavates deep holes in the earth for its burrow, where it passes the day, and only goes out at night after food, which consists of various roots and fruits. The female brings forth three or four young ones at a birth, the spines or prickles of which are very fine and pliant. They are shy and timid animals, and only when irritated use their spines as means of defense, by raising them and wounding the aggressor. These prickles or quills, filled with a kind of spongy marrow, are variegated with black or brown and white rings, and are used as pen or pencil

handles. They shed their quills as other animals do their hair, and as the new grow, the old are easily shaken out; and thus has the fable arisen, namely, that the porcupine has the faculty of shooting his quills at pleasure and wounding his enemy from a great distance. They are hunted out of their burrows by dogs, and then killed either by blows or bullets. They become very fat, and the flesh, which is well tasted, is said to resemble that of the hog. Taken young, they are easily tamed.

There are several relative species found in America.

The *Hare* (*lepus*),  $\frac{4}{2}$ ,  $\frac{0}{1}$ ,  $\frac{1}{1}$ . The rodentia of this tribe are distinguished by the arrangement of their incisor teeth, which are double, each one having a smaller tooth behind it. They are timid, harmless creatures, and easily recognized by their large eyes, long ears, fine skins, and stumpy tails.

The *Common Hare* (*lepus timidus*), plate 11, fig. 7, has a yellowish gray coat, but is white on the under part of the body and tail; the upper surface of the latter is black. It is about the size of a large cat. It is found all over Europe, and inhabits woods, copses, and fields, where it has its form behind some hillock or hedge. At night it sallies forth in quest of food, and eats the seed buds, gnaws the bark of young trees, and nibbles the cabbages. It runs very swiftly, but better up hill than down, on account of its hind legs; but its course is never in a straight line. Having leaped a few hundred paces in one direction, it stops, pricks up its ears, and gazes all around; then, starting off on a new run, it will cross and recross the first path, thus misleading the scent. When surprised by the huntsman, the poor animal remains quietly crouched down behind a clod, and is frequently passed by without being seen; and it some-

times happens that in the chase the huntsman, believing the hare to be shot dead, orders the gamekeeper to take it up, when, to the surprise of all, the cunning little animal will start up and scamper away. If wounded or in trouble, it utters a mournful cry. The male and female hares are designated buck and doe, like deer; the young, which first see the light in summer, come to the world with their eyes open; from two to four are produced at a birth. The little creatures are easily tamed, and can be taught many amusing tricks, such as drumming and shooting off miniature cannons. Late autumn or winter is considered the best time for hunting them; sometimes by the regular chase, and again only with harriers, very seldom, however, on horseback, *par force*, which is only for amusement and in such a manner that the huntsman kills them with a stroke of his riding whip.\* They are also taken in snares. The flesh is considered as the most delicate game, the skin serves for linings, the hair is used by hatters, the hind feet are employed as whisks, and the fat for medicine.

The *Rabbit* (*lepus cuniculus*), is less than the hare, with shorter hindlegs, but nearly the same in color. Their true home is Spain, but they have spread over all the warmer countries in Europe. They dig deep holes for their retreats, and undermine whole forests with their burrowings, which makes them a nuisance to the foresters. Each pair of rabbits make a separate asylum for themselves, with an entrance so narrow that a fox can not creep through. Their increase is even greater than that of the hare, and as, like them, they feed on vegetables, grain, and roots, and do the same damage, they have

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\* This remark refers to the custom of hunting hares in Germany, where they are considered a nuisance.—*Tr.*

nearly been hunted out of Germany. The flesh by many is considered quite palatable, but when not properly cooked, it is stringy and of a sweetish taste; therefore it is not in general favor. The French, however, are fond of it, and cherish the animal, which, as already mentioned, they hunt with ferrets; and, in England, where the breeding of rabbits is well understood, they are kept in warrens, and serve as good and wholesome food for the lower classes. The young rabbits, however, are considered worthy to be served on the tables of the rich. The skin is less valuable than that of the hare. One variety of the species is called the *Angora Rabbit*, plate 11, fig. 6, and in form resembles the above described, but its hair is longer and very fine, and therefore is very valuable to hatters. This species is variously colored, some being quite white with red eyes and called Albinoes, others are of a silver gray, and are very much prized. Their increase is even greater than that of their wild brethren, being from nine to ten at a birth. Many are kept as playthings, some of their owners, however, turn them to profit by plucking the hair, and selling it to the glove-makers, etc.

The *Guinea Pig* (*mus porcellus*), Cavia,  $\frac{2}{2}$ ,  $\frac{0}{0}$ ,  $\frac{8}{8}$ , belongs to the tribe Cavia. There are several varieties; the one best known is the *Common Guinea Pig* (*cavia cobaia*), plate 9, fig. 9, is only half the size of a rabbit, it has four toes on the fore feet and three on the hind. It is originally a native of Brazil, where its color is gray; it is an active, restless little animal, easily tamed, and living on all kinds of vegetables. When domesticated its hair is of different colors, white or varied with orange and black, in irregular patches. They are gentle and timid little animals, doing no mischief by



gnawing, and will feed on bread, fruit, roots, salad, etc. They are very cleanly and fond of their young, of which they produce from two to four, and have round, naked ears like those of a mouse. The most remarkable variety of this species is the *Capibara*, vulgarly termed *River Hog*, and is not known in Europe.

*Hydrochærus Capibara*.—This creature is about the size of a year old pig, and resembles the larger sea hog, has webs between its toes, and is found in all the large rivers of South America, where it feeds on grass and other plants. The young can be tamed, but the old are very strong, and give battle when molested or shot. The flesh is used as food.

## SIXTH ORDER.

### EDENTATA.

The common distinctive character of this order is the absence of the incisor teeth. Many families are without the canine and molar teeth, also; so the animals being toothless, are called *Edentata*. Their extremities are peculiarly formed, the claws are so stout, that, having once fastened those hooked weapons on some object, they can not be dislodged without cutting off the limb; this singular power of the extremities is also possessed by the smaller species of the class.

I.—Family of *Tardigrada* or *Sloths*. They have short stumpy heads, and no cutting teeth. The race best known is that of the *Three Toed Sloth*, or *Ai*,  $\frac{0}{0}$ ,  $\frac{0}{0}$ ,  $\frac{5}{4}$  (*bradypus tridactylus*), plate 6, fig. 6. The fore feet are so much longer than the hind, that the animal walks

with great difficulty, although it climbs trees easily. For this movement the sloth is provided with strong claws, which, arranged on the inside of the fore paws or hands, are fixed when at rest. Their motion is very slow but sure, for the animal never quits its hold where it has once fastened, and having gained one branch, it serves to climb the whole tree. Their eyes are small and dull, and their bodies are covered with brownish gray hair, much resembling dry hay; they live in trees, and are natives of South America. They climb the trees so that the branch on which they creep is always above instead of under them, and in this position feed on the leaves and fruit. When the sloth has eaten enough on one tree, he comes down, or, seizing on a neighboring branch, he passes to another. It is not true, however, that he never leaves a tree until it is altogether stripped, and then, too lazy to descend, suffers himself to fall from it. By day the *ai* is a stupid animal; at night, however, he is active enough. He suffers himself to be captured without making any resistance, but the huntsman must beware of his claws, for if they fasten on him they are not to be loosed. He is remarkably tenacious of life, so much so that when disemboweled or his head taken off, it is said that his limbs will still move. His voice is mournful and plaintive, something like the mew-ing of a cat in pain. The female makes her lair in the fork of a tree, and brings forth only one cub at a birth, which clings fast to its mother. The sloth can not bear a cold climate; its flesh is well tasted. In size it reaches to that of a middle-sized dog, or seventeen or eighteen inches. The male of a relative species, *Sun Sloth* (*bradypus cuculliger*), have \*bright yellow spots on the back. The name, *Ai*, is derived from its plaintive cry.

The *Unau* or *Two Toed Sloth* (*choloepus didactylus*),  $\frac{0}{0}$ ,  $\frac{1}{1}$ ,  $\frac{4}{3}$ , is larger, and stronger, and more active than the ai; he can swim over broad rivers, and uses his long canine teeth and sharp claws as weapons of defense.

II.—The *Armadillos*,  $\frac{0}{0}$ ,  $\frac{0}{0}$ ,  $\frac{1\frac{1}{4}}{1\frac{1}{4}}$ , are singular animals, having the whole body covered with a hard, scaly coat, which on the back resembles armor, but leaves a free movement to the neck and feet. They are at home in the broad forests of South America; dig out burrows very expertly with their strong claws, and feed on various kinds of insects, such as ants, etc., and worms. They can neither run, leap, nor climb trees, but being very strong and expert in digging, they never require more than three minutes to excavate a place of retreat, in which they wedge themselves so tightly that they are often mutilated in the taking out. The armadillo lives alone, no two ever being found together in the burrows, except the female and her young. They are stupid animals, and never become accustomed to the society of men. They are frequently hunted on account of their delicate flesh. The *Kapassi* (*dasypus novemcinctus*), *Banded Armadillo*, plate 6, fig. 6, is over two feet in length, with a pointed muzzle, upright ears, and long tail; the under part of the body is hairy. It has from seven to nine bands, and the flesh is considered very palatable food. The *Giant Armadillo* (*dasypus gigas*) is nearly the size of a hog, has irregular and very large claws, from twelve to thirteen bands, and  $\frac{0}{0}$ ,  $\frac{0}{0}$ ,  $\frac{4\frac{3}{8}}{4\frac{3}{8}}$ . No other animal has so many molar teeth as this species, which is found only in Guiana and Paraguay, and even there but rarely.

III.—The *Chidna*—*Ground Hog*—(*orycteropus*),  $\frac{0}{0}$ ,  $\frac{0}{0}$ ,  $\frac{3}{3}$ . The most remarkable and perhaps the only species is from the Cape (*orycteropus capensis*), and

is about the size of a hog; has a long, pointed muzzle, and stiff, upright ears; the body is well proportioned, of a reddish brown color, and armed with bristles. Their teeth resemble species of broken sea-shells, which are perforated; with their sharp nails they dig deep holes, in which they dwell; their food consists of ants and other insects. The flesh is considered very palatable.

IV.—The *Ant Eater* (myrmecophaga). The ant eater is entirely without teeth; the muzzle is drawn out in a long cylindrical tube, which is terminated by a small mouth. This is furnished with a tongue, which, covered with a viscid, gluey humor, they protrude so that the ants may settle upon it. The *Tamanoir* or *Ant Bear* (myrmecophaga jubata), plate 9, fig. 8, is from four to five feet in length; his tail, three feet in length, is covered with long, bristly hair, which the Indians use for various kinds of ingenious wicker work. His fore feet are armed each with four claws, which, like those of the sloth, serve him not only for taking strong hold, but also for scratching up ant-hills. The tamanoir walks slowly, and feeds on ants only. Shunning the light, he is essentially a nocturnal animal, and lives a solitary life on the elevated plains of South America. On finding an ant-hill he scratches a hole in it, and protruding his long, slender tongue, which has the appearance of an earth worm within it, so that the ants may adhere to it, it is soon covered, and then retracting it, he swallows thousands. Although slow and unwieldy, nature has not left him defenseless. If an enemy approaches too closely, he grasps the intruder within his fearful claws, and, like the bear, squeezes him to death. No animal can withstand the power of those murderous fore claws; even the jaguar itself, it is said, is unable

to contend with him. His cry is a shrill and piercing sound, something like *Rrrrr*. The female brings forth but a single one at a birth, which she carries on her back until it is able to find food for itself. The flesh of the young tamanoir is eaten, but that of the old is tough. There is a smaller species, such as the *Tamandua*, which lives in the trees, and feeds on ants and milipedes.

The *Pangolin* or *Scaly Lizards* (manis). These animals are altogether edentate, and have the long, slender, worm-like tongue of the ant-eater. Their bodies are covered with sharp, square scales, laid half over each other, like shingles. They roll themselves into a ball like the hedgehog, and move very slowly. They live in holes and feed upon ants. The best known species are

The *Four-toed Manis*, or *Phatagin* (manis tetradactyla), plate 9, fig. 7. Is found in Guinea; two feet in length. Its scales are armed with points. Relative races are found in India and China. Pangolin and Ælian speak of the scaly lizard by the name Phatagin. This tribe also includes the most remarkable animal of Australia, namely,

The *Ornithorynchus* (ornithorynchus paradoxus), plate 13, fig. 3. This singular creature is about a foot and a half in length, with brown hair, like the otter. The muzzle is terminated by a horny beak like that of a duck; and to aid in a further resemblance, the edges are provided with small transverse plates. It has only two teeth, which are cartilaginous, and situated far back in the mouth. The fore feet have a membrane which not only unites the toes but is carried beyond the nails; on the hind feet a smaller web terminates at the root of the nails. The tail is short. The male has a kind of spur on each of his hind feet, which is connected with a small

sac, where poison is secreted. With these weapons of defense he is able to inflict severe and inflammatory wounds, which are, however, not deadly. These curious animals are found in New Holland, on the banks of rivers, where they feed on all kinds of aquatic plants. They play together in the water like ducks, and live in holes which they dig in the mud. It has not yet been proved whether they are oviparous or viviparous, as the opinions of the natives vary on that subject. They can not bear imprisonment, and die very soon if confined.

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## SEVENTH ORDER.

### PACHYDERMATA, OR THICK-SKINNED.

The animals comprised in this order are *ungulate* mammals—that is, they have hoofs, and do not ruminate. They are mostly large and heavy, and, instead of claws, have a very large nail on the extremity of the foot, which member neither serves for carrying food to their mouths nor climbing trees, but merely as a supporter to the body. They feed principally on vegetable matter, and are, next to the ruminants, our most useful animals. They are divided into two classes—*Pachydermata Ordinaria*, which have two or more toes, and *Solipedes*, which have only a single hoof. The first of the class *Ordinaria* is,

The genus *Elephant* (*elephas maximus*), plate 12, fig. 4,  $\frac{2}{6}$ ,  $\frac{0}{6}$ ,  $\frac{4}{4}$ . Two species are known to us—the African and Asiatic. The first is a wild, stubborn animal, which, although capable of being tamed, is never made to serve for domestic purposes. But the other, the Indian



elephant, is very docile, and is employed in the service of man. He has an oblong head and concave front, but what at a first glance strikes the eye is his great trunk or proboscis, which serves for both nose and hands. The trunk, a double tube, is movable, and terminates above by an appendix in the form of a finger, with which he examines every thing before putting it into his mouth. His eyes are small but expressive; his ears, large, flat, and movable, lie close to his head like that of a man; his neck is short and stiff, so as to support his large head; his back is bent, and sloping toward the tail; his skin is hard and bare, some bristles or coarse hair issue out of it here and there, and it has many folds or wrinkles, which are movable, some being hollow and others prominent. Flies can be crushed to death between them, a feat which he voluntarily performs. At the end of his tail is a tuft of coarse, bristly hair; the feet are short and small, divided into five toes, which are garnished with claws; their gait is heavy, but, although unwieldy and awkward in turning, the length of their steps give a rapidity to their march which the best horse can not equal. The females are distinguished from the males by having smaller tusks, which are not projecting like those of the latter, and by the udder, with two mammæ, formed like those of the cow, being situated on the chest. Their average height is ten feet, their length being about the same. They seldom attain to sixteen feet. The usual color of these animals is a grayish brown; there are some that are reddish, and others quite white. These last named are the most prized. They are of a sociable nature, and live in companies, mostly in forests lying in the neighborhood of rivers, as, their skins being so dry, frequent bathing is essentially necessary. They swim well, and dive to

considerable depth, keeping only the end of the trunk above the water. Their common food is juicy or mealy plants, roots, etc., but they are particularly fond of sweet things, as sugar cane, corn, etc. In a domesticated state they are fed on hay, grass, corn, fruit, bread, etc., of which each one consumes sixty pounds per diem. The statements of the menagerie men, who declare, to the astonishment of the public, that the elephant consumes daily one hundred and fifty pounds, is not true; sixty pounds of dry, nourishing fodder, is sufficient for one elephant. The trunk is a most useful member, and is used by the animal to convey food to his mouth, to pump up his drink, and then pour it into his throat. Ten quarts are reckoned as the measure of one draught.

He is very fond of the odor of flowers, and has a great partiality for spirituous liquors and pungent substances. Tobacco he also eats readily. His dislike of mice, which little pests are impudent enough to creep up into his trunk when they can, is very evident. If angry or frightened he will utter a fearful bellow; but when playing, or on meeting some one whom he is acquainted with, his voice is not unpleasant, but, as though speaking through his trunk, it resembles the tones of a bassoon. The female elephant brings forth but one young cub about the size of a good calf, which she suckles for two years. It does not reach its full growth for twenty-five years. When fully grown, its weight is often seventy centners, and it is said that the elephant lives two hundred years. He is captured in various ways. In India men go out in troops, often consisting of thirty or forty thousand, to hunt these animals. They surround the forest where they live, and the true huntsmen, mounted on tame elephants, ride within this circle, which, by the

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out-posters still advancing, is gradually growing smaller. Watchfires are next kindled, so as to offer an impediment to their running away, as they are afraid of fire, and will not pass it. The huntsmen are furnished with ropes, on which are running knots. Having come within proper distance these ropes are thrown, and entangling his feet, his progress is soon stopped. The next act is to manacle his hind feet, and this being done, two men take charge of the captive; the tame elephants force him to obey, and follow them into a shed, where he is confined. The keeper now soothes him, sprinkles his body with cold water, treats him kindly, but does not feed him too well; therefore, partly by dexterity and kindness, and partly by severity, they succeed in taming him in five or six weeks. Another method of taking the elephant is the following: In the middle of the forest a large square amphitheater is formed and encircled, with stakes to which cross pieces of timber are fastened. Within this enclosure there is another palisade, made of stakes two feet apart, behind which the huntsmen may retreat; there is another great opening, through which the elephant may go in, with a trap hanging over it, or a gate, which is shut behind him; there is also a smaller, which leads to the court where they are to be tamed. The huntsman, mounted on a female elephant, rides through the forest, and covers himself with branches, so as to conceal his person. Attracted now by the cries of the female decoy, the wild elephant approaches; the rider turns back, and, riding slowly, is followed into the enclosure; the trap falls, and he is a prisoner. As soon as he finds himself shut up, he bellows with rage and becomes furious. His captors now endeavor to soothe him, by throwing water plentifully upon him; next, his legs and trunk are fet-

tered with ropes, and, tied to a tame elephant, he is led to the court, where he is chained to a strong pillar, and left to vent his anger as he pleases until the next day. He is then fed very sparingly, and the food is let down from a scaffold. Under such treatment, and weakened by his ineffectual struggles, he gradually submits, and by dexterous management is tamed in a few days.

The elephant is sometimes taken in pitfalls, which are laid in his way and covered with bushes. It is, however, difficult to tame him by this mode of capture, and he is mostly killed in the pit. Wild elephants are bad neighbors to the adjacent plantations. Coming to the cultivated lands they consume a prodigious quantity of food, and waste more by trampling. Nothing turns them from their course but fireworks, which, thrown in among the troop, sometimes turns them back. It is a common practice, too, to shoot at them, but it requires very expert marksmen to send effective bullets, it being difficult for the leaden messenger to penetrate the well protected skull or heart, on account of the thick hide, which is almost bullet proof. The wild elephants are not always satisfied with what food they can find in the fields, but, when hungry, will pull down storehouses and help themselves. The garrison of a fort in Ceylon had, on a plantation which bordered on a forest, a block-house which was used for stowing up provisions, the principal part of which was rice. During the rice harvest the men remarked that a troop of wild elephants were in the vicinity, and fearing their depredations, hastened to gather the grain into the storehouse with all possible speed. The task was completed, and after placing a guard, the soldiers had withdrawn, and the coast being now clear, the whole wild herd marched boldly up to the



block house and surrounded it. The sentinels, not daring to contend with this formidable enemy, ran off to the fort to obtain help, leaving one soldier behind to watch the procedure. One of the strongest elephants commenced an attack on the corner of the granary, and using his formidable tusks, soon began to loosen the stones. When he was wearied another took his place, and so others, alternately, until at length, by their united efforts, they effected an entrance. In an incredibly short time they made a breach large enough to admit the body of a large elephant, and forming into single file, the whole troop marched in. They did not, however, neglect to place a sentinel, so as to give the alarm in case of danger, and it was not until they had eaten to their full satisfaction, and trampled most of the remainder under foot, that the rescuing party made their appearance. The watching elephant gave the warning signal, and in a moment the whole troop was off to the forest, trumpeting notes of exultation through their trunks, as if mocking the enemy they had so adroitly cheated.

The elephant, when once tamed, becomes, partly from his great strength, partly from his docility, intelligence, and affection for the human race, a most useful animal. In the earliest times he was used in war, but now that fire has become the element of war and the principal instrument of death, he would be more dangerous than useful, as, naturally afraid of fire and terrified by the noise of the artillery, he would turn on his own ranks, and kill as well as be killed. The guiding of the elephant is done by his keeper or *cornac*, who, mounted on his neck, makes use of an iron rod, crooked at the end, with which he strikes him gently. If, becoming angry, he shows himself dangerous (which is not uncommon),

his keeper can easily kill him by striking him on a particular part of the neck. One blow on a certain spot between the head and the first vertebral joint is sufficient to end him. The elephant is possessed of uncommon strength, bearing burdens of from two to four thousand centners, and is an indispensable adjunct in a tiger hunt. Many examples are related of his intelligence, gratitude, and also of his revenge. A gentleman in India had a favorite elephant, and was wont always to be present at the time his keeper was feeding him. Business, however, demanded his absence for many weeks, and he gave the charge of feeding him to his servant. This man, however, was greedy and avaricious, and gave the poor animal only half the food to which he had been accustomed, so that he became very lean, and by the time his owner returned looked as if ready to drop down. The faithless servant declared he could not imagine what was the reason of the animal's falling away, as he had been well fed. At the next feeding time, however, his master was present, and a full portion, of course, was placed before the animal, who, dividing it into two portions, ate one eagerly, and, after first touching the other with his trunk, pointed to the servant in such a manner that the gentleman at once guessed the cause of his favorite's appearance.

Another elephant once accidentally fell into a ditch, and could not get out, but on having blocks of wood given to him, he constructed a kind of stairs, and so extricated himself.

In Naples, an elephant was made to attend masons, and used to carry the water for mixing the clay in a large copper vessel; he did not fail to remark that as often as the cauldron received an injury, it was carried

to a certain coppersmith that it might be mended ; and, therefore, one day, seeing a small hole through which the water leaked, he carried it himself to the smith, waited until it was repaired, and then went on with his work as usual. He is very sensible of kindness, and remembers his benefactors even when in a ferocious state. A market woman was in the habit of giving a handful of green herbs to an elephant every day as he passed to his work. He was mostly gentle, but once, in a fit of temporary madness, he broke loose from his keeper, and rushed into the market, from which he soon drove the frightened people. His friend, the gardener's wife, was not less alarmed than the rest, and fled for protection to a neighboring booth, and, in her terror, left her little child behind. The elephant, furious as he was, remembered the stall and the favors shown him there ; and, as he passed through the market and drove the people before him, he took up the child in his trunk and seated him gently on the roof of the stall. The elephant does not like to be teased or slighted, and if offended, is apt to revenge the insult, as is proved by the well-known story of a tailor, who was in the habit of giving a piece of sugar to an elephant which was driven past his shop daily. One day, however, as the animal thrust his trunk through the window, expecting the dainty morsel, as usual, the sugar was not forthcoming, but, instead, he received a prick of the tailor's needle. He went away without any manifest emotion, but on his return, having filled his trunk with muddy water, he sprinkled it over the tailor, and spoiled his work.

In Paris and Marseilles elephants are taught to act in the theaters, and they are so intelligent and docile that they never forget their part ; once, however, one of the

four-footed actors saw proper to extemporize, and going up to the leader of the orchestra, who was marking the time, looked into his note-book. A slight stroke of the baton on his trunk was sufficient to check his curiosity, and he at once resumed his part, and played it to the end.

Although the Indian and African elephants are much alike in appearance, they differ greatly in tractability and intelligence. The African mostly remains wild, and, according to the authority of "Schlegel's Historical Researches," it is proved that in the early times only the Indian elephant was used in battle.

#### PACHYDERMATA ORDINARIA.

The *River Horse* (hippopotamus amphibia), plate 12, fig. 2,  $\frac{4}{4}$ ,  $\frac{2}{2}$ ,  $\frac{1\frac{1}{2}}{1\frac{1}{2}}$ . This genus has four equal toes on each foot, and are the most badly proportioned of all the mammalia. The river horse, although from ten to twelve feet in length, is only four feet in height; his eyes are small, his bristly mouth very large, his body hog-shaped, and covered with a thick, impenetrable skin, on which is, only here and there, a few rough bristles; his tail is short, his color a blackish gray, verging, on the lower surface of the body, into brown. This animal is found all over Africa, and takes his name from his voice, which is like the neighing of a horse, and Nile,\* near which river, in early times, the species was most numerous; now the river horse is seldom found in that region, but abounds at the Cape. His food consists of aquatic plants found in the river, but at night he visits the fields on the shore, where, as he feeds, he commits sad devas-

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\*. German *Nilpferd*.

tation. The pursuit of the hippopotamus is very dangerous, as he is not easily come at by land, and also because never far from the water, he takes to it immediately when attacked; but even should a huntsman come within shooting distance while he is on shore, a bullet could not enter his impenetrable hide. He is therefore hunted in the following manner. His pursuers either lie in wait for him on his way to the cultivated lands, or else steal upon him whilst he is sleeping on the shore; a harpoon, to which is fastened a strong rope with a block at the end, is thrown, and its barbs penetrate the tough skin. He flies at once to the water, venting his pain and rage in frightful roarings, as he dives below the surface; the huntsman leaps into his boat, and fastening a stout rope to the block which is attached to the harpoon, steers for the land or a larger vessel, during which the strife being renewed, the other huntsmen in boats, are attacking and wounding him with lances. Enraged and smarting with pain, he often rushes against the boat, seizes it with his teeth, and often tears pieces out of its side; this is dangerous, and often sinks the frail craft. At length he is killed by a blow on the head, whilst he is still in the water. The strength of the party is often insufficient to drag him to the land, therefore his body is dismembered in the water and carried off in pieces. The flesh of the young hippopotamus is considered palatable; the skin, however, is the part most valued, as it is excellent for making riding-whips; a single hide will make five hundred. The teeth are never used; many have asserted that they are so hard that fire can be stricken from them, but this statement is erroneous. It is only in later times that the river horse has been brought alive to Europe; the old Romans, however, were well acquainted with him.

The *Hog* (*sus*),  $\frac{6}{6}$ ,  $\frac{2}{2}$ ,  $\frac{1\frac{1}{2}}{1\frac{1}{2}}$ — $\frac{1\frac{1}{4}}{1\frac{1}{4}}$ . The canine teeth or tusks of this race are different from all others, inasmuch as they project from the upper as well as the lower jaw, and as they sometimes grow to a great length, when used as weapons of aggression or defense, they inflict very serious wounds.

The *Domestic Hog* (*sus scropha*), plate 11, fig. 10, has a strong snout or muzzle suited for rooting in the ground, fine, bristly hair, and thin, corkscrew tail; it varies in size, and has four toes armed with hoofs, the two large middle toes rest upon the ground; the lateral toes are shorter and smaller. The wild hog is scarcely to be distinguished from the domestic. His color is black; his home is in deep forests, mostly in the vicinity of fens, because he is fond of wallowing in the mud, and feeds on everything that comes in his way, rooting in the ground after roots, etc., but not at all refusing plants, worms, larvæ, fruits, eggs, and even young birds. The wild hog is considered the most dangerous chase in the European forests, but he is only so when molested or wounded, for in other cases, or when not pursued, on meeting a man, he will stand quietly for a moment, and look him in the face, and then run away as fast as his unwieldy motions will allow. When hunted by dogs he becomes very ferocious, ripping up their bodies with his frightful tusks, and turning to attack the huntsman, to whom remains but two ways of escaping. He must either direct his hunting-spear or cutlass so that the wild hog must impale himself upon it—and it requires much skill in woodcraft to do this properly, for if it hits upon a bone rather than the throat, which is the part aimed at, he is lost—or else climb a tree, and let the



infuriated animal pass by, which, being suffered to do, he seldom renews the battle.

The female is very prolific, bringing, at a litter, four, eight, and sometimes twelve young pigs to the world, which are mostly white, and, until a year old, are called shoats. Hogs are fond of rubbing against the resinous trunks of the pine trees, by which, although of some advantage to the laying in of a good stock of fat, a kind of crust is formed over the whole body, making it almost bullet-proof. Wild hogs are valuable on account of their excellent flesh, but if suffered to intrude on the cultivated lands do more damage than they are worth.

The domestic hog is, as most know, of various colors, and is distinguished by his movable ears. Originally a native of the Old World, this useful animal is now found everywhere. He eats everything, and his love of wallowing in the mud is well known; this he does more on account of its cooling influence than from filthiness; and although hogs are considered the most uncleanly of all animals, they are in reality not so, for they bathe whenever opportunity allows, and will not thrive if they are not frequently washed. The voice of the hog is a kind of grunt, which, when he is troubled, is exchanged for a pitiable squealing. He has some good qualities, and is capable of strong attachment to his kind, for if a male and female are brought up together when young, and the latter loses her companion, she pines away, and often dies. He is also obedient to his master, and in many parts of Italy is used to discover truffles. Neither is the hog destitute of sagacity, as is proved by the success of an Englishman, who trained a young wild hog to do the duty of a setting dog. Pepper has been considered to be poisonous to this animal, but it is not true; it is

only when it is introduced in a powdered state through his nose into the bronchial tubes, that it kills or injures him. Hogs are voracious, and will eat animal food, and are sometimes known to devour their own young; they will pursue young ducks and geese, and are dangerous to little children. The use of pork has been common to every age; prepared in various ways, and considered as wholesome food, it has been eaten by every nation on the earth except the Jews and Mohammedans. It is, however, seldom used in summer, on account of a distemper to which hogs are subject; and even in winter, if fed improperly, they become measled,\* which injures the flesh and renders it disgusting. It is also a vulgar belief that the internal structure of the hog closely resembles that of man. This, however, is not true.

Naturalists have classed this animal, the *Indian Hog*, *Babiroussa* (*sus babiroussa*), plate 12, fig. 6, with the foregoing, which he closely resembles, except in the form of the tusks and in having longer legs. Their quadruple and tender tusks shoot out from the jaws most formidably; the two in the lower maxilla are fashioned like those of the boar; the others which come from the upper jaw pierce the cheeks, or rather lips, and rise crooked or bow-shaped to the eyes. The *babiroussæ* live in herds on the islands of the Indian Archipelago, and swim with great dexterity. They feed on everything, much as the common hog, but do not root in the ground to such an extent, and are very fond of fruit.

Another species of hog, found in South America, and called the *Mexican Hog*, is distinguished principally by its having upon the back some singularly-shaped

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\* Or have small pustules under the skin, or in the flesh.

glands, from which are discharged an offensive, ichorous humor.

The most remarkable of this class is the *Peccary* or *Mexican Hog* (dicotyles torquatus), which is of a tawny brown color, with a collar-like stripe of white on the neck. One of the hind toes is wanting. This animal, together with his larger relative, the *Pingo* or *White-lipped Peccary* (dicotyles labiata), lives in every part of South America, and, in its habits, resembles the wild hog. It is more easily tamed, and becomes more attached to man than any other species of the swinish race, but when pursued and irritated, it becomes very fierce, and turns on the huntsman with savage fury. On its being killed, it is necessary to cut off the glands on the back immediately, or the flesh will have an unpleasant taste.

The *Rhinoceros* (rhinoceros), plate 12, fig. 1. The rhinoceros is only half as large as the elephant, and, instead of a trunk, has a short, finger-like projection on the upper lip, and, also, in place of tusks, has a solid horn on his nose, the bones of which are very thick. Some species have two of these powerful horns. The ears are erect; on each foot are three toes; the skin, thick and hard, like that of the hippopotamus, is impenetrable to bullets, and, without hair, is studded with warts and covered with wrinkles. Animals of this genus are found in India and South Africa. They feed on plants, like the elephant, and wallow in the mire, like hogs. When irritated, the rhinoceros is fierce and dangerous, and, as though driven by madness, tears up the earth with his horn, and, with an activity not to be expected from his bulky proportions, runs round, dislodging stones and clods, as if about to use them as weapons of assault. Still, he never attacks, except provoked. Taken captive

when young, he remains either sullen or intractable; and woe to the hunter who meets the wild rhinoceros when enraged, for, flying upon him, he tramples him under foot, and rips up his body with his formidable horn. His voice, when he is calm, resembles the grunting of a hog, but when aroused or angry, he utters a sharp cry, which may be heard at a great distance. Many fabulous stories are told of this animal, such as, that he lives in continual enmity with the elephant, or that, if poison is poured into a cup made out of his horn, it will instantly froth and foam so as to betray it. His flesh is eaten by the natives, and the tough, thick hide, made into leather, is used for shoe soles and in the manufacture of whips. The marksman, in shooting the rhinoceros, aims always at the eye, as that is the only place where he can be mortally wounded.

The *Rock Badger* (*hyrax capensis*) is not larger than a rabbit; its body is clothed with soft hair, and its toes are covered with hoofs, which causes it to be classed in this order. Its color is of a grayish brown, with black stripes on the back. It is a harmless, tractable, and confiding little animal, living entirely on vegetables. Its home is the Cape of Good Hope. A relative species is found in Syria and Palestine, and belongs, according to Moses (*Leviticus*, xi. 5), under the name *Choerogryllus* (*Schaphan*) to the number of animals forbidden to the Jews as unclean.

The *Tapir* (*tapirus*), plate 12, fig. 5,  $\frac{6}{6}$ ,  $\frac{2}{2}$ ,  $\frac{1}{4}$ . There are several species, some of which are native in India, some in China, but the one best known to us is the American (*tapirus Americanus*), which has four toes on the fore feet and three on the hind. In form it is like a hog, with a short trunk, and is mostly about the size of

a yearling calf. Although his trunk measures only three inches, he can use it very dexterously in taking up articles and breaking off the stems of plants. Like the hog, the tapir delights in swampy places, and is fond of lying in the water; he swims with great activity, and lives principally on vegetables. Taken young he is easily tamed, and becomes much attached to persons, but is apt to be troublesome, as he eats or gnaws all the linen he can find, and does great damage in his visits to the sugar cane and rice fields. In a wild state he is very shy, but when driven to a strait, becomes bold and will turn in self-defense, and having overturned his enemy, seeks to trample upon him. His body is but thinly covered with hair, his neck is adorned with a bristly mane; his color is brown, but the young are spotted with white. His flesh tastes like beef, and, as he is of gentle temper, it would well be worth the trouble of trying to turn him into a domestic animal.

SOLIPEDES.—ONE-HOOFED.—(*Equii.*)  $\frac{6}{6}$ ,  $\frac{2}{2}$ ,  $\frac{1\frac{1}{2}}{1\frac{1}{2}}$ .

In the one-hoofed family is found the *Horse* (equus caballus), with a single toe apparent, consequently a single hoof. These animals have six incisors, which, in the earlier years, have depressions on the crown, so that their age can be decided by their teeth, and on the neck a mane. The horse exceeds all other species of this genus by his proud and noble carriage, his long, movable ears, and flowing mane and tail, which is ornamented with long hair. His height is from five to six feet, his length the same, and in beauty, swiftness, endurance, and courage, surpasses every other animal, while his attachment to man is only equaled by that of the dog or

elephant. His large, brilliant eyes, as they glance intelligently round, seem as if they would assure man, "I will be your companion everywhere, and aid in your conquest of the world." He has no trunk like the elephant, or muzzle like the hog, but he expands his large nostrils, and neighs a welcome to his master when he meets him. His upper lip is movable, and being prehensile, serves as a hand for taking up his fodder, and, when very familiar, is often inserted into his master's pocket in search of sugar or other dainties. His body is covered with smooth, short hair, and in the nobler races, the skin is as fine as that of a human being.

Since the earliest ages the horse has been the faithful servant and noble companion of man, and in all the relations he is called to fulfill, whether to carry his lord to the battle or the chase, to draw him in his coach, serve him in the plow, or in any other way, he does his duty faithfully. He expresses in his neighing the various emotions by which he is swayed, and the tones differ greatly either as called forth by greeting his master, the demands of hunger and thirst, or utterance of joy and pain. He bears suffering in mute tranquility, or if violent, moans like a sick man, and only in the moment of death sends forth a cry of such intense agony as to touch the most insensible heart. By nature he is most tractable and gentle, rather disposed to be timid and shy than fierce, and it is only from receiving bad treatment from cruel masters that he learns to kick and bite. His only weapons of defense are his hind feet, but with these he is able to keep off the most ferocious enemy, and uses them effectually against the aggressions of savage beasts. The common color of the horse is brown; in a wild state he is sometimes a tawny yellow or mouse color. His



usual paces are a walk, trot, and gallop, but, by careful training, he acquires many others. His attachment and faithfulness to a master who has been kind to him and whom he loves are without parallel.

We will mention an example which occurred in Napoleon's army, and is stated as fact.

In the battle of Jena, near the bank of the river, a trumpeter was shot; his horse remained by the body until it was cold, and resisted all attempts made to lead him away. The circumstance having been accidentally mentioned to the emperor, he ordered that the horse should be watched, and accordingly, after the corpse was buried, the horse was seen to walk slowly to the river, where he plunged in and was drowned.

This attachment is more manifest in the horses of Arabia. If an Arab, overcome by weariness, in the desert lies down to sleep, his horse keeps faithful watch over him, and on the approach of danger awakens him with loud neighing. Among the Bedouins, the horse lives in the same tent with the family; the animal's neck is often the pillow of his rider; the children climb over him, and play fearlessly with the colts. The Arabian values his horse as his greatest treasure, and not even necessity will induce him to part with him.

A poor Bedouin of the desert was possessed only of a handsome mare, which the French Consul at Said was desirous to purchase for his king. The Arab hesitated for a long time, but he was very poor, and as he considered the condition of his starving family at home, want drove him to consent to part with his favorite for a high price. Clothed in his rags, the Arab brought his courser to the consul's door, dismounted, and leaning against his beloved animal, looked first at the tempting gold as it

was offered, and then at her. His heart failed him, he sighed, and at last wept. "To whom," said he, "am I going to give thee up? to Europeans! who will tie thee close, who will beat thee and make thee miserable! Return with me, my beauty, my jewel, and rejoice the hearts of my children." Then springing on the back of the animal, he was out of sight in a moment.

That horses have cunning as well as memory is proved by the following instance. An officer belonging to the troops of the line stationed at Calcutta, was a very corpulent and heavy man, and as he disliked walking, purchased a strong horse, intending to ride. He had, however, scarcely seated himself in the saddle, when the animal, conscious that a heavier burden than usual was imposed upon him, lay right down, forced his rider to dismount, and could not be brought to submit by any means whatever. The captain sold him. After a few years he was advanced to the rank of general of the brigade, and was called into the interior to hold a review. He traveled in his palanquin, and having arrived at the post, he inquired after a horse, as he wished to ride when he reviewed the troops. One of the officers mentioned that his horse, a very fine one, was at his service. A tall, strong, and handsome charger was led out, but as the general was about to mount him, to the astonishment of all, the animal lay down; and this singular behaviour being made the subject of conversation, it was soon discovered that the horse was the same once owned by the general.

Tartary and Thibet are said to be the native home of the horse, and these animals are still found there in a wild state. The received opinion that there are now original races of wild horses, is without foundation, as the

wild horse of Tartary is very shy, and can not be tamed, but when captured pines away and dies. These animals are found in troops in the vast forests of Upper Asia; they will not suffer a tame horse to come among them, but at once attack and kill him. There are also wild horses found in South America; however, they are not native to the country, but have sprung from the stock of Spanish horses brought by the first invaders from Spain, and finding their way to the primitive forests, have there become wild. They live in large troops, of which one of the boldest and strongest is the leader. If they see any strange object approaching, they will gallop off about two hundred paces and then stand still to take an observation, and finding themselves still likely to be disturbed, they once more take to flight, and are soon out of the reach of the pursuer. They are sometimes attacked by the jaguar; and when this is the case, they form a line, and defend themselves by striking with their hoofs. The South American wild horses, unlike those of Tartary, will, on meeting a tamed horse, neigh an invitation to attract him, and very willingly admit him into the troop.

When hunting the wild horses in the prairies of America or on the Pampas, they are driven, by mounted riders into certain inclosed spaces, and whilst still galloping at full speed, a lasso is thrown over the head of the one selected as a prize, and now the wild horse, in spite of all his rearing and striving, is made a prisoner and saddled; a practiced rider mounts his back, and using his spurs manfully, rides him at full speed until he is completely tired.

The horses most prized are the English and Arabian, although in the faculty of endurance, the former can not

compare with the latter. Those of Russia, Poland, Hungary, and the Siebenbürgen are the most hardy of all the race; the greater number of them are ugly. The swiftness of the English horse is scarcely to be credited; he has been known to pass over a space of thirty to thirty-seven feet in one second. Germany possesses some valuable races of horses, the most important of which are the following: the Mecklenberg, which in character much resembles the English; the Trakhener, which comes from the English Arabian; those of Neustadt, which are descended from the English and German races, and very enduring. The Wurtemberg horse is valued on account of his Arabian blood, and lastly, the Salzburg stock, which, on account of their size and weight, are best calculated for draught. Another race is that of the Pony or Dwarf, which comes from the islands, and is never above three or four feet high. The handsomest of this race come from Corsica and Sardinia, where, in the early times they were termed *Manni*; and at the present day the race still exists in the Shetland Isles, Java, and Sumatra. Most of them are distinguished for their beauty and spirit. The use of the horse both for draught and burden is well known, but it is to be lamented that his services are not rewarded as they deserve to be, for, after being pampered, caressed, and valued in their youth, most of them are condemned to an old age of neglect and misery. Although the flesh of the young horse is said to be palatable, horseflesh is never used among civilized nations as an article of food, partly because it would be too expensive, and again because the meat of the old, however well fed, is by no means well tasted. The Kalmucks and Tartars, however, use it freely, as well as the milk of the mare, from

which last-named article, they prepare a kind of brandy. The female produces one foal annually, seldom two; at the age of five years the colt is fully grown. If well cared for, the horse will live twenty-eight years, some have said fifty, and even more, but these are rare instances. If spared, and well treated in youth, this noble animal will still be serviceable, even in his twentieth year, but as most of the race are badly used, and put to work too early, they are worn out at the age of twelve, and sink down into miserable hacks. There are some relatives of the horse family which are distinguished by their long ears, short mane, and naked tail, which is only tufted at the end, and are without the horny warts on the hind feet.

The *Ass* (*equus asinus*), is one of these relatives and smaller than the horse; is of a grayish brown color, and has the figure of a cross marked in black on his back. His original home is in Asia. His voice is a discordant bray, and, both in form and character, he is only the caricature of the horse. His motions are slow but sure; his obstinacy proverbial, for when he is determined towards a course, he is not to be diverted from it either by force or kindness. He bears blows with the most stoical indifference; his hard, tough skin, which, tanned, is made into parchment, is altogether insensible of pain; and he exhibits true courage in his patient endurance of injury. He is afraid of fire-arms, and becomes unruly in their presence. Too dull and stupid to be trained like the horse, his memory is, nevertheless, excellent, so that, after having once traveled a road, he never forgets or mistakes it, however intricate; and for this reason, as well as being perfectly sure-footed, he is preferred before the horse in mountain journeys. His life is sustained at little cost;

his food is of the humblest kind. He will not drink any but the clearest water; nevertheless, as he is not accustomed to be cared for, or habituated to cleanliness, he will roll in the dirt whenever he can. The ass can not thrive in a cold climate; the handsomest are found in Spain and Italy. Asses' milk is considered very nourishing, and is recommended as a specific remedy in consumption.

The *Mule* is an intermediate creature between the horse and ass, being the offspring of their union. They differ, however, according to the degree of parentage. When the dam is an ass, the foal resembles her in size, but in form is like a horse; if the other, the reverse. They are preferred to horses by every traveler in mountainous countries on account of their sure-footedness and power of endurance.

The *Wild Ass* (equus onager), is found in greater numbers in Asia than the wild horse, and is distinguished for its swift movements and symmetry of its bodily proportions. The offspring of the wild and tame ass is highly valued, otherwise they would be hunted as legitimate game, as the flesh of the wild ass is eaten, and by the ancients that of the sucking foal, termed by them *Lasilio*, was considered a great dainty.

The *Dscheggetai* (equus hemionus), holds the middle place between the horse and the ass, and resembles the former in his bodily structure, with a black mane and long tail; his coat is an isabella or bay color. This beautiful, but shy, and, on that account, but little known animal is found in the inaccessible mountain steppes of upper Asia, and was known and tamed by the ancients under the name of Hemionus.

The *Zebra* (equus zebra). Very much like the ass



in form and proportions; is remarkable for the beauty of his skin, which is adorned with regular ribbon-like stripes, which in the female are alternately black and white, and in the male brown and yellow. It is the most beautiful of the equine race. It is a native of South Africa, and was known to the ancients by the name of *Hippotigris*. Many attempts have been made to tame the zebra, but as yet without full success, as, although brought to a kind of submission, he remains restive and intractable. There are several species; the *Onagga* or *Mountain Horse*, and the *Zebra Pigafetta*, between which there is scarcely any perceptible difference. The *Couagga* (*equus quaccha*) resembles the horse more than the zebra, as he is only striped on the shoulders and head, the rest of the body is bay. He is more docile than the zebra, and the colonists of the Cape have accustomed it to the harness, but it always remains vicious, and is sometimes fierce. Its cry resembles the barking of a dog, and from it he derives his name, *Couagga*. It has never been brought to submit to the saddle. A great deal has been written concerning the family of the *Solipedes*, among which several less important families than those we have named are numbered; the horse is, however, the one principally spoken of.

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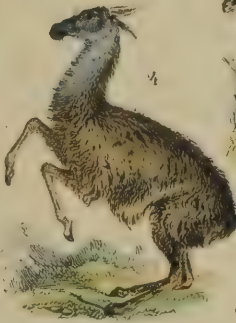
## EIGHTH ORDER.

### RUMINANTIA.

#### BOVES.—HORNED AND UNHORNED.

This order, considered in an anatomical point of view, differs widely from all others, and the animals belonging

to it are distinguished by the following characteristics. They have no incisors in the upper jaw; on each foot are two toes enveloped in two hoofs, behind which are two others, which, very small, are rather horny excrescences than perfect toes. Their name is derived from the circumstance of their chewing the cud, that is, the power, after having first swallowed their aliments, of bringing them up again and chewing them. They are herbiferous, and have four stomachs; the first is the *paunch* (rumen), which is the largest, and receives the food on the first chewing; after having remained there for a certain length of time, it is brought back into the mouth, masticated, and passed into the second stomach *honey-comb* or *bonnet* (reticulum); from this it goes directly into the third stomach, the *many plies* or *omasum* (psalterium), and last of all, after being operated upon by the leaflets of the last named division, into the *caillette* (abomasus), or *rennet-bag*. Every one who has eaten tripe, knows the appearance of these four stomachs. The inside of the paunch is shaggy; that of the reticulum like the cells of a honey-comb, which, in a few of the class—the camel for instance—serve as a reservoir for water. The *psalterium* or *leaflet*, is composed of many parallel folds provided with knots; between these leaves the alimentary substances are ground; and the fourth, *caillette* or *rennet-bag*, is shallow and slimy, containing only a few projecting folds within its cavity. Most of the animals of this order are used as food by man, and many which are domesticated, render immense service to their owners. Ruminants are divided into horned and unhorned.





## FIRST FAMILY.

## RUMINANTIA. — UNHORNED.

In the family without horns the *Camel* stands first; there are two species of this genus, the *Arabian Camel*, with one hump (*camelus dromedarius*), which is called the *Dromedary*, plate 10, fig. 1, and the *Bactrian Camel* (*camelus bactrianus*), which has two. The feet of the camel are not cloven, for, although they have two toes, with a kind of hoof, they are united underneath by flexible soles.  $\frac{0}{0}, \frac{2}{2}, \frac{1.0}{8}$ . They are large and awkwardly formed animals, and are natives of the wild steppes of Asia and Africa. The humps, which they carry on their backs, are large bunches of fat, very loosely placed; these seem to be formed only for a superabundance of nourishment, for in long journeys, when food is scarce, they very sensibly diminish. Large callosities, resembling horn, are found on the breast and joints of the legs; these are not natural, but produced from the constraint of lying down or kneeling. The Arabian, or one-humped camel is found principally in Africa, and is called by the Bedouins, *the ship of the desert*. The name is certainly well applied; his progress is not only swift and steady, but he has the faculty of passing several days without drinking, and can subsist on an astonishingly small amount of food. A large camel will carry a burden of from seven hundred to a thousand pounds weight; in the commercial journeys they only travel from ten to twelve miles a day, but without a load, their average rate is twenty. The gait of the camel is by no means pleasant to the rider, for it is a kind of jolt, which makes it tiresome, and keeps him in constant danger of losing

his balance, seated as he is upon that high hump, the dromedary, therefore, is preferred by most travelers, as the two humps form a kind of saddle. Vermin are very often found harboring in the hair of these humps, which prove a sore annoyance to the rider. There is no need of whip or spur in driving the camel; they love the sound of the human voice, and as their conductors sing in slow or rapid time, the docile animal regulates his pace accordingly. Gentle as he is, he does not willingly submit to be overburdened, for, as he kneels down to receive it, if he finds the load too heavy, he will not rise until part of it is removed. When traveling in the desert for many days without drink, they will smell a pool of water a long way off, and, urged by thirst, they set forward with all speed to reach it. If a caravan, as is sometimes the case, is in danger of perishing for want of water, and the instinct of the camels fails to direct them where it is to be found, the poor animals are killed, in order to supply the want, as in a *fifth* stomach, which serves as a kind of reservoir, pure water is always retained. There are seasons when the camel departs from his usual gentleness, and is fierce and unruly, but for the most part they are the most submissive and gentle of all the animal creation.

The two-humped camel is most frequently used in Asia; he is larger than the dromedary, which measures from five to six feet; the former, or Bactrian camel reaches to six and seven, and is also distinguished by having, beside his rough outer coating of hair, an inner one of fine silky wool, which is used in the manufacture of valuable stuffs. This species also bears the cold better than the dromedary, and has therefore been introduced into Italy by the Grand Duke of Tuscany. The flesh



of the young camel is very palatable, and considered wholesome; those who have eaten it say it tastes like mutton. The milk is very rich and nourishing; the Arabs feed their young colts upon it, in order to make them grow up strong; and there is not a part of this valuable animal which is not turned to profit. The female, like all other large animals, only produces one foal at a birth.

The *Llama* (*auchenia llama*), plate 10, fig. 4. The llama, in form, much resembles the camel, but it has no hump, and is not larger than a stag. It is found in the neighborhood of eternal snow, and can not endure heat. Peru is its native home, although it has been domesticated in Chili. It is used for bearing burdens, as the camel, and is easily tamed. One species, the *Guanacos*, is still found wild among the mountains. The young llama is as gentle and docile as a dog, and on account of its graceful beauty, is cherished as a household pet. It can, nevertheless, be excited to anger, and when enraged will spit its offensive saliva in the offender's face. This saliva has been stated to be of an acrimonious quality, which, however, is not true. Like the goat, it will, in self-defense, butt with its head and strike with its feet; these are its only weapons of warfare, and it is never the aggressor. Active as the chamois, it leaps from height to height, and in its domesticated state can not be bound—so great is its activity—by enclosures, as it will clear the highest without any trouble. It is used for the same purposes as the camel, will carry a burden of seventy-five pounds, and travel four or five leagues a day. Bearing their heads proudly aloft, and with ears erect, they step along with the greatest leisure and caution. They will not be driven by force, but can be led by kindness to perform any task suited to their capacity.

It is, however, only the males which are used for carrying burdens. Their color is various, but is mostly a chestnut or reddish brown, and besides the outer coat of long, thick hair, they have under it a silky fleece, which is very valuable, and used in the manufacture of various articles. The flesh which is as good for table use as that of our sheep, and the milk rich and palatable, makes the llama a most useful addition to the usual domestic stock.

The *Vicunia* (*auchenia vicuna*) is a smaller species, and although in its conformation it resembles the llama, is not larger than a sheep. It is never used for carrying burdens, but is only valuable for its fine and beautiful wool. As it only inhabits the regions which lie along the line of perpetual snow of the Andes in Chili and Peru, the attempt has been made to transplant this species into Europe.

The *Musk* (*moschus moschiferous*), plate 11, fig. 5, is about the size of the chamois, or goat, and is distinguished by a long canine tooth on each side of the upper jaw, which, in the male, descends upon the lower lip and protrudes from the mouth, as well as a pouch—only found in the male—on the under surface of the body, and furnishes the well-known perfume, called musk. The coat of this animal is a brownish gray; in the young, it is spotted with a lighter color, and so short a tail as scarcely to be seen. It is found only in the Alpine ranges, between Thibet, China, and Siberia. The musk deer are beautiful animals, and, bounding over the ice-fields with light and agile step, scarce leave the traces of their feet, often leap over frightful chasms several fathoms wide; and, although uncommonly timid, will also swim over the largest rivers. The favorite resort of this pretty

creature are the pine forests, where the huntsmen go to seek after it. If taken quite young, the musk-deer can be easily tamed ; nevertheless it never loses its timidity, but always remains fearful. In the last century there was one of these animals brought to Paris. A strong odor of musk always accompanied it, and, instead of walking, it leaped like a hare. The pouch containing this much-prized perfume is about the size of a hen's egg, and is filled with a reddish colored oily substance of such a powerful and permanent odor that the smallest particle is sufficient to perfume a great quantity of other matter, and does not lose its power even at the end of several years. The Thibet musk is the best, as the Chinese is greatly adulterated, and consequently loses much of its value. It is well known as an article of medicine. The flesh of the young musk is used as wholesome and palatable food ; but if the old are to be killed, the musk-pouch must be first removed on account of the strong odor which is said to be dangerous to the hunters, as, when fresh, it is said to be so pungent as to cause severe bleeding at the nose.

## SECOND FAMILY.

### RUMINANTS WITH HORNS.

The animals of this class are divided into three families :

I.—Those who shed their horns periodically, as the *Stag* genus.

II.—Such as have horns which are not deciduous, but enveloped in a hairy skin, are continuous with the head, as the *Giraffe*.

III.—Those who have also horns which do not perish, neither are they clothed with hair, but the bony part of which is covered in a case formed of an elastic substance which grows by layers, and continues to do so throughout the whole period of life. Oxen, sheep, goats, and antelopes belong to this family.

I.—THE STAG.—(*Cervus*.)  $\frac{0}{8}$ ,  $\frac{1}{0}$ ,—sometimes in the male— $\frac{1}{1}\frac{2}{2}$ .

This genus is distinguished by the shedding of their horns or antlers every year, and by the males only having horns, for, with the exception of the species called reindeer, they are always wanting in the female. The fashioning of these antlers is one of the most wonderful operations of nature. At about six months old, there appears on the head of the young stag two tubercular swellings, which remain through life, and form the foundation of the horn (Rosenstock\*), and are covered with the skin of the head. At a year old, and every succeeding spring these tubercles are lengthened and become very tender, the enveloping skin gives way, and small spikes or spears shoot forth, forming horns, which remain naked for some time. As soon as these spikes attain their length and become hard, the young stag rubs them against the trees, in order to clear them from the scurf, with which they are covered, and now his head is adorned with a pair of handsome white horns, but which, in a few days, assume a yellowish brown hue. During this time of growing, the young shoots are very tender, soft, and full of blood. Every year, after the third, the horns on

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\* English—knobs; the young deer is called a knobber.—PAUFFON.  
—Tr.

being reproduced, have an additional antler, so that—in many of the species—the age of the animal may be reckoned by the number of these branches. The female reindeer, the only female of the whole stag order being permitted to carry horns on her head, is but another proof of the wise liberality of Nature, inasmuch as the animal, obliged to feed on moss, roots it up from among the snow and ice with them. Not less wonderful than the changing power of Nature is her activity in renewing, for the horns of the oldest stags, with all their branching antlers, are fully perfected in four months from their being shed. Not only remarkable for the beautiful ornaments of the head, the stag race is also distinguished from the rest of the forest tribes by light and elegant form, size, swiftness, and strength, and seems as if created to adorn, animate, and occupy the peaceful retreats of Nature. Living in the solitude of the forests, they feed there on the tender sprouts of trees and all kinds of herbs and roots, and are very delicate in the selection of food. Very shy by nature, it is a difficult matter to tame them; they never live long in confinement. Freedom is their element, and they die of grief when deprived of it.

They are divided into two families, namely :

A.—Deer with horns flat at the ends, or palmated.

B.—Deer with horns or antlers round at the ends.

A.—The *Elk* (*cervus alces*), plate 11, fig. 2, sometimes, but erroneously, called the *Moose Deer*, as the name comes from *Elenn*, a word, which in the old Teutonic, signifies strength and swiftness. The elk is the largest animal of this class; his stature sometimes exceeds that of a horse, being over six feet high, and from seven to eight feet in length. His legs are very long, and on

this account he runs with great rapidity. His neck is stout and short, his head long, his mouth expanded, and in front cartilaginous; the horns of the male form two flattened plates of a triangular shape, and deeply denticulated on the outer edge, in the full-grown animal, weigh fifty pounds. His hair is of a dark-brown color, and very coarse; he has a quantity of long hair under his neck, forming a kind of mane, which gives to the elk—a heavy, disproportioned animal without this appendage—a singularly wild and savage look. At present, these animals are only found in the northern wilds of Europe, Asia, and America, but in the earlier times, when the face of Germany was covered with forests, they were native there. They delight in low and swampy places, and run with such swiftness that a dog can not overtake them. In going through a morass, where there is danger of sticking fast, they lie down on one side, as the author once witnessed, and in this position drag themselves through the thick mud with equal ease and dexterity; they do the same on very smooth ice. As the legs are very long and the neck disproportionally short, these animals have some trouble in grazing, therefore they feed principally on young twigs and tender bark, which they peel off in the most skillful manner, and thereby do great damage to the forests. They are also fond of heather and reeds, and will nip off small twigs as neatly as a gardener would do it with his shears. They possess the sense of smelling in the highest degree, and this, with their extraordinary swiftness, makes it a difficult matter to hunt them. Notwithstanding they are naturally gentle; these animals become exceedingly fierce when wounded, and, turning upon their pursuers, will overturn them with their powerful horns, and trample them to



death with their fore-feet. The female elk produces at most two calves at a birth, which are mild but melancholy little animals, and if captured when very young, become so tame that they will go to the pastures, and feed with the domestic cattle. The principal use derived from the elk is from the flesh, which is very good, particularly that of the young; the mouth, ears, and tongue are considered dainties. The bones, horns, and hoofs, used by the turners and made into various articles, contribute also to the convenience of man, and in the days of early superstition, the latter was considered a specific in the cure of epilepsy. The skin, however, is the most valuable part of the animal, as it makes excellent leather, and is impenetrable to musket balls even when discharged within a short distance

The *Reindeer* (*cervus tarandus*), plate 11, fig. 1, is about as large as a stag, but has shorter and stronger legs, and a short, thick neck. The female, like the male, has horns, which are round at the foundation, but branch out in the form of large, denticulate palms. The color of the wild and tame reindeer is very different: that of the latter is spotted brown and white, sometimes altogether white, etc.; that of the wild is grayish brown or yellow. The reindeer, like the elk, inhabits the most northern regions, and is distinguished from all the stag race in being more docile and easily tamed, and in the icy regions of those polar lands is as peculiar a blessing of the great Creator to the dwellers there, as is the camel to the denizens of the steppe or arid desert. The snowy and inhospitable wastes of Lapland, Greenland, Iceland, and Siberia would be uninhabitable to human beings did not these useful animals furnish them with food and clothing. The wealth of a Laplander consists

of his herds of reindeer ; the rich have several thousands, but the poor man must content himself with ten or twelve. Every part of this animal is applied to the use of man ; the milk, skin, sinews, bones, hoofs, horns, hair, and flesh furnish him with the most he needs ; the flesh serves for food, the skin for clothing, the sinews are made into twine or bowstrings, the bones, hoofs, and horns are fashioned into various domestic utensils, and the intestines are made into thread of excellent quality. The females, like cows, are driven home every day to be milked ; the milk, more substantial and richer than that of the cow, is used in all their cookery. The Laplanders do not use butter, but they make cheese. In summer the reindeer live on buds and tender plants of all kinds ; hard grass and hay they never eat, but their food, in winter, is a white moss (*lichen rangeferinus*), which they plow from under the snow with their horns, and is found in great abundance in those regions. We know it by the name of Iceland moss, and it is somewhat remarkable that it seems to suit them better than green fodder, as, whenever they feed on this lichen, which is only in winter, they grow very fat. When the reindeer is four years old he is harnessed to a sledge, which is very light and covered with reindeer skins. Instead of iron on the runners, they are lined with reindeer skin on the under surface ; the hairy side is turned against the snow, so that the sledge glides easily forward, and when ascending a mountain is less apt to recoil. The harness is very simple, consisting only of a broad strap of leather, which, passed round the neck, is fastened by both ends on the breast by a stout thong ; this thong goes under the body between the legs, and is fastened to the sledge. The guiding rein is tied to the root of the horn ; it is

only a single cord, and, as the driver throws it to one or the other side, the animal is directed to the right or left. Their common gait is a trot, and in swiftness and perseverance far exceeds the horse; one of the swiftest is known to have passed over twenty-four feet in a second, which was a rate of twelve miles an hour; and it is not uncommon for a good reindeer to travel over one hundred and twenty miles in a day. While running in full speed they make a crackling noise with their hoofs by striking them against each other. The reindeer sometimes forget their natural gentleness, and become vicious and unruly, refusing to obey their guide; they will turn furiously upon him and attack him with their feet. In such a case there is no resource left but to kill the animal or overturn the sledge and take refuge under it until his fury is subsided. The reindeer can not be ridden as his back is not strong enough to bear the weight of a man. The young reindeer are prettily spotted and remain with their mothers for a long time; but, as they do not live more than fifteen or sixteen years, and the flesh of the old is not quite so good as that of the young, they kill most of the latter. Every part of this useful animal serves the Laplander for nourishment. The blood, mixed with vegetables, is made into a kind of haggis or pudding, and the liver, kidneys, brains, and marrow are eaten, either raw or frozen, as great delicacies; even the young sproutings of the horns, as is the case in the deer of our own country, are also used as an article of food. These animals are by no means choice in their diet; they will eat almost anything; even the poisonous mushroom (*agaricus muscarius*) is devoured with impunity, producing no worse effect than a temporary intoxication. The gadfly, however, is a great plague to them, which, bur-

rowing under their skins during the preceding summer season deposit their eggs ; these, being hatched, the young flies eat holes in the skin, often causing an incurable disorder. In order to avoid this real plague, the wild reindeer wander in great droves from the plains to the woods and mountains, and seen from a distance, with their branching horns, resemble a moving forest. In hunting, the reindeer are either shot or taken in pitfalls or traps. The bear is their greatest enemy ; the wolf and glutton also make war upon them ; they are, however, able to contend successfully with the latter, by using their horns and fore feet as weapons of defense. These animals are seldom found in the more thickly-peopled regions, the climate even at St. Petersburg being too warm for them. They can not bear imprisonment, and no matter what kind of treatment they receive, they soon die if deprived of liberty. Their voice, when they utter a sound, which is seldom, is a kind of grunting noise. Some few species are distinguished by having an uncommonly thick coating of hair.

The *Fallow Deer* (*cervus dama*), is somewhat less than the stag ; in winter of a dark brown ; in summer spotted with white. The posterior portion of the body is always of a beautiful white, surrounded with one black stripe, and the rather long tail is black on the upper surface, and white on the under. His horns, at their commencement, are round, but become flat and pal-  
mated towards their endings ; and much resembling the stag in form, like him he carries his head erect and proudly. Barbary is his original home, but many centuries have passed since the species were transplanted to the temperate regions of Europe, where they are reared in parks, and become familiar and tame. Their flesh is

more tender than that of the stag, and their habits are the same in every thing except one: they never bathe nor seek the water, which the stag does. Their favorite places are sheltered valleys with gentle acclivities. The skin is much prized by the glove-makers on account of its softness. The male and female are distinguished as buck and doe.

*B*—Deer with round horns.

The *Stag* (*cervus elephas*), plate 11, fig. 4, is commonly found to be four feet high and seven long; in summer he is of a yellow brown, with a black line along the back. The loins and the tail are always of a tawny yellow. The stag is the largest and most beautiful animal found in our forests, to which it is not peculiar, being frequent in the temperate regions of Europe and Asia. The male is remarkable for having one incisor in the upper jaw. This is of such a glistening white color, that sometimes the huntsmen use it as an ornament. The tear ducts secrete a clammy fluid, which, on being exposed to the air, becomes hard, and is of agreeable odor, and by the superstitious is considered to possess some mystical power in the healing of disease. The horns, shed annually, are constantly altering by the reproduction of new spikes, and nature accomplishes this task with so much regularity, that the age is determined by the number of these branches. In the first year, when the fawn has only two of these pointed tubercles, he is called a *Knobber*; in the second, these are augmented by some other spears, when he receives the name of *Brocket* or *Staggard*. In the third, however, these spikes are thrown off, and replaced by horns, which have each three branches, and are denominated antlers. The branches

still continue to increase in number until the seventh, when they form a beautiful appendage to the head.

The stag mostly dwells in thick woods, from whence he goes out only in the late evening to seek for food. At the first appearing of the sun he again seeks his shady lair, where he lies all day, quietly ruminating. By nature this animal is extremely gentle and sociable; his legs are slender, but very strong, his body beautifully proportioned, and his movements graceful and full of dignity. His eyes are large, and full of fire; his senses of smelling and hearing are in such perfection that he is aware of the approach of huntsmen while yet a great way off; he is, besides, very curious, so that if he meets a man who is unarmed, he will not fly, but, after standing still and looking at him for a little while, he will pass him quietly—indeed, proudly. The stag is uncommonly fond of music, and listens with pleased attention to the sound of the shepherd's pipe or flageolet. He is quick to remark when danger is nigh, and flies from the huntsman with a speed almost incredible; knows how to baffle his pursuers with many cunning turnings and windings; and when fairly an object of the chase, oustrips the fleetest horse in swiftness. Leaping over hedges six or eight feet high, and laying back his horns, he breaks through the tangled recesses of the forest, and swims through stream or river without hesitation or dread. Sometimes, when wounded, he sets himself at bay, and becomes dangerous to the huntsman when he uses his horns as weapons of defense or aggression. Jealousy sometimes incites him to battle with others of his kind. Nothing can exceed the obstinate contention of two angry stags, as with expanded nostrils and cries of rage they rush at each other, tearing up the earth with their fore feet, and butting with



their horns, which, rattling against each other, produce a sound which might easily be mistaken for that produced by a battle with clubs. Such a contest ends only in the flight or death of one of the parties, and it is said that, sometimes, during the fierce strife, they become so entangled by their branching horns, that, not able to unloose them, they die of hunger.

The doe seldom has more than one fawn at a birth, and never exceeds two, which she nurses carefully until they are able to follow her. At first they keep behind the mother, but soon learn to run on before, and if threatened with any peril she hides them in the grass or some deep thicket, and then, with much instinctive cunning, shows herself to the pursuer, and whilst allowing herself to be chased in their stead, seeks to mislead the enemy by many false turnings and windings.

This animal is very delicate in his choice of food, which consists of grass, different kinds of herbs, young buds and tender roots of trees, mushrooms, etc. The wild jessamine and mistletoe are favorite edibles, and, in winter, he does considerable damage in the grain fields. Thirty years is considered the space of a deer's life, although, from the testimony of hunters, they sometimes live forty.

The usual time for hunting this beautiful animal is from May until the middle of September (the does and fawns are hunted in winter). To chase the deer is considered fine sport. It was formerly the custom to hunt the stag *par force* ; that is, the noble animal was chased by men on horseback and dogs, through swamp and river, forest and field, until, perfectly exhausted, he fell to the earth, when he was finally dispatched with hunting spears. It was a cruel and useless sport, inasmuch as not only the overheated flesh of the poor animal, not fit food for

human beings, was thrown to the dogs, but the horses and hounds, driven to assist in the unnecessary chase, were often urged beyond their strength and made to suffer. In the present day it is usual to shoot them. One of the deer-stalkers stations himself at a place where the deer are known to pass as they come in the evening from the wood, and either fires in among the herd, or drives them in the direction where other marksmen are lying under cover. The flesh, called venison, is much esteemed, being well-tasted and wholesome. The skin, tanned into buckskin, is valuable for making gloves and other articles. The horns, whilst in the sprouting state, being very tender, are admitted to the tables of the great as delicacies, but after becoming hard, or in the old, are converted into knife-handles, and serve also in the manufacture of spirits of hartshorn and volatile salts.

The young stag is easily tamed, but attempts to reduce him to servitude, although sometimes successful, are not without danger, as he often shows himself restive in the highest degree. In the parks where deer are kept, they will come like sheep to a certain place to receive food; more readily, however, if attracted by salt, of which they are very fond. The plan for taking one of these animals alive and uninjured, is to spread a green net and drive him into it, and he soon becomes entangled in its meshes. After being freed, he can be lured, by appealing to his most sensitive member, namely, the tongue, to any place the hunter may choose. Three men may in this manner capture the largest stag. White stags are very rare, and found only in the parks of royalty.

The *Canadian Stag*, found in North America, much resembles the foregoing, but is larger, and has more beautiful antlers. The *Virginia Stag* is still handsomer,

it is of a clearer yellow color, and smaller than the fallow deer, neither are its horns so large. One of—perhaps the most beautiful—of the stag race, is the *Axis*, or *Deer of the Ganges* sometimes called the *Hind*, of Sardinia, which, although a native of India, can bear to live in a European climate. Its limbs are most delicately formed, its color a clear red, and its coat ornamented with fourteen rows of white spots; its horns are round, and increase to a great size as the animal grows old. One species of the axis has a mane on his neck.

The *Roebuck* (*cervus capreolus*) is the smallest of the stag genus, his length rarely exceeding three or four feet, or his height two and a half, with a tail only one inch in extent. His horns are rather small, and never have more than three branches. If this animal is less noble or less strong than the others of the stag race, he surpasses them all in vivacity, courage, grace, and the elegance of his movements; he is found all over Europe, and harbors mostly in dry and mountainous regions, never seeking the neighborhood of large streams, and is full of vigor and agility. His eyes are like those of the gazelle, and in fleetness and cunning with which he baffles pursuit, far exceeds the stag, and often, when pressed too closely, resorts to artifice. He first confuses the scent, by various windings, and, having accomplished this purpose, springs aside, with one vast bound, and lies flat down among the bushes until the dogs have gone by. The roebucks never forsakes their mates, but with their young, forming themselves into a little family, keep together. They are never seen in herds, like the stag; the fawns, mostly two in number, follow their mother, and are of a clearer brown color than the old ones, and handsomely spotted with white. The fawns are often cap-

tured, but, although easily tamed, as soon as they arrive at a certain age, are sure to seek their liberty, and if, after this manifestation, they are still kept confined, invariably die; neither can they live in small parks, where they have not a wide range in which they can indulge their love of freedom. They are more delicate in their choice of food than the stag, and browse upon the buds and young fresh leaves, often to such excess as to be injurious; at such times it is easy to surprise them. The roebuck is sometimes shot as other game, but for the most part he is hunted down; his sense of smelling is so sharp that a marksman must be very cautious to succeed in getting within shooting distance. The flesh of the male is considered in season during the whole year; the female is, however, spared, although furnishing a much preferable article of food. The skin makes soft and good leather. Peaceful and gentle, they do much less injury than any other of the wild races; they utter a sound something between a bark and a bleat, and their lives seldom exceed sixteen years. Sometimes a roebuck is found with wonderfully mis-shapen horns, and these are placed in museums, or treasured as curiosities.

Related to these above described, are the *White Roe* of South America, the posterior portion of whose body is white, and the *Indian Stag*, or *Muntjak*, whose cutting teeth project from the upper jaw; the horns are short and forked. Their color is a reddish brown, and the hair very glossy.

Belonging also to this genus is the *Red Deer* (*cervus rufus*) of South America. He is a handsome, well-proportioned animal, resembling the stag in color; the posterior portion of the body and throat are white, and the tail, which is somewhat long, is thickly covered with

hair. His horns are like those of a young roe, with two or three points; the statement of some naturalists, who declare that the deer of this family have no branches, has arisen from their having seen only young specimens of this race. In size this animal rather surpasses the stag of the north. It is found in the primitive forests of South America, and when captured young, is easily tamed. His flesh is prized as an article of food, but, independent of this consideration, he is hunted because he commits great ravages in the sugar plantations.

## II.—RUMINANTS WITH HORNS ENVELOPED IN A HAIRY SKIN, WHICH ARE NEVER SHED.

The genus *Giraffe* (*camelopardus giraffa*), plate 11, fig. 3. Measured from the top of the head to the fore feet, he reaches, when full grown, to the extent of eighteen and nineteen feet in height; his neck is very long, and his fore legs so much longer than the hinder, that his back slants upwards like a roof; the color of his skin is white, and mottled with large, angular, yellow spots. Africa is the native land of this singular animal, which was well known to the ancient Greeks and Romans,\* and from the resemblance of its form to the camel, and the spotted coat like that of the panther, they gave it name of the *Cameleopard* or *Panther*. In later times, the giraffe has been brought alive to Paris and London, and thus a better opportunity for observation is afforded. The male giraffe differs from the female, in having, in the middle of the forehead, in front of the horns, a large tubercle, which appears like a third horn. As if to cor-

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\* Pliny and Ossian both describe it.—*Th.*

respond with its singular shape, nature has given to this animal a very peculiar gait, which is not a trot, but a kind of ambling limp, caused by his placing his two feet on one side alternately forward; besides this ridiculous pace, he has also a gallop, during which his head, perched at the extremity of his long neck, sways backward and forward, in order to assist him to preserve the centre of gravity. Looking awkward and seemingly lame, one would suppose he could be easily overtaken, but, as in each of those jerking steps he clears a large space, and and can spring over an extent of fifteen feet, he is so swift that the best racer can scarcely overtake him. He ascends more easily than descends; and therefore is more readily overtaken in going down hill than up. The giraffe is a very gentle animal, suffering itself to be led everywhere, and never resists oppression; its tongue is black, and half a foot in length, and is very useful in carrying food to the mouth, in which service the animal uses it with great dexterity. In Africa, its principal food is the leaves and twigs of the acacia families; it will crop the grass, but, like the horse, has to bend its legs in order to reach it. The old giraffe can not be tamed, and remains restive under all kinds of treatment, using its fore feet as weapons of defense. In a state of captivity, it is fed with rice, bread, beans, apples, etc. The flesh of the full grown giraffe is never eaten; that of the young, however, which is said to taste like veal, is used occasionally for food by the natives of Africa.

### III.—RUMINANTS WITH HORNS, OVERGROWN WITH SHEATHS, AND ARE NOT DECIDUOUS.

These are divided into two varieties, those with curl-



ing, annulated horns, as the antelope, goat, and sheep; and such as have them smooth and straight, as the ox. The first of the curled horns is the *Antelope* or *Gazelle*, and as principal of the family, we shall begin with the *Chamois* (antelope rupricapa), plate 10, fig. 2. This is the only specimen of the race which is known in Europe. It is three feet, two or three inches long, and two feet in height, with a short tail. The horns are bow-shaped, annulated at the base, and bend backward; the eyes singularly beautiful, are large and black. The male has a glandular knob between his horns, the hair is of a grayish brown, short and stiff. The antelope is light and graceful in form, very agile and swift, lives altogether in the Alpine regions, only venturing to the low lands in winter to seek for food. Timid in the highest degree, they shun all intercourse with man, and possessing a most acute sense of smell, they can scent an approaching huntsman from a great distance. They live in herds, and when in danger of any enemy or otherwise disturbed, they give the alarm to the rest by a shrill whistle and stamping of the fore feet, and in an instant the whole troop is off at full speed over rock and glacier, and so rapid is their flight, that it is useless to pursue them. The chamois hunters declare that one is always stationed on some elevation to keep watch while the rest are grazing. They know how to place their delicate feet on rocks and places inaccessible to man, and will stand securely on some jutting precipice not more than a hand's breadth in width. Only the old males are seen alone, and it has been observed that they are the only ones that ever visit the valleys. Taken young, they become as tame as goats, but, like the roe, will not stay in the neighborhood of men's dwellings. Their food

consists of the most delicate parts of the succulent herbage of the Alps, choosing it carefully. They are fond of licking salt, and the marksmen generally find and shoot them in the neighborhood of rocks and places which are impregnated with saltpetre or common salt. The males are very jealous, and wage fierce battles with one another. The female has seldom more than one kid, sometimes two, and the whole race are beset with dangers, snares, and enemies of all kinds. Many are overwhelmed by the fall of an avalanche, the lynx, wolf, and bear are constantly watching to surprise them, and the murderous lammergeyer carries off their young. But the worst enemy of all is man, who, in spite of the peril and difficulty of hunting the chamois, still persists in following them into places seemingly inaccessible. The huntsman, carried away by excitement, sometimes passes days before he gets within shooting distance, plunging into the most dangerous passes of the mountains, climbing painfully from rock to rock, or crawling along the edge of a rugged precipice in order to retrace his path. He must not only possess determination and courage, but the steady hand which befits the marksman, so that the bullet, sped at a distance of three hundred paces, may not miss. He seldom kills more than one chamois in one of these expeditions, as a single shot disperses the herd past all possibility of pursuit, and the route is often so difficult that he can hardly bear his load from the mountains. Sometimes, however, his temerity leads him into danger, for, if every way of escape has been cut off from the troop of chamois, they will turn upon their enemy and dash him down the precipice. Notwithstanding all the dangers and difficulties above related, and others not less formidable, from wind, storms, avalanches, and thick fogs,

which hide the way, the love of the chamois chase is an insurmountable passion. Knowing no danger or despising it, the hardy huntsman thinks himself fully rewarded by being able to carry home his prize, for which, when he sells it, he receives at most from ten to fifteen florins.\* The flesh of the young chamois is considered excellent food; and a very fine leather used in glove-making is manufactured from the skins.

The greater number of the antelope races is found in Africa and southern Asia, where they are seen wandering about the grass-covered plains of these lands in company with other herbivorous animals, as zebras, giraffes, quaggas, and buffaloes, forming altogether so large a troop, that, in full gallop, they might, at a little distance, be mistaken for a squadron advancing to the charge. The most of this race are beautifully formed, fleet, like the chamois, and cunning as the roe-buck which it resembles. Such is the brightness and gentle beauty of their large black eyes, so light, elastic, and graceful their movements, that they serve to furnish similes to the poet, and to call a woman "gazelle-eyed," and compare her step with that of the "silvery-footed antelope," is to pay her one of the highest compliments. Nevertheless there are some of the antelope races, which are distinguished by having a heavier form, and being rather unwieldy, like the ox, which they resemble; indeed, instead of the beauty generally considered peculiar to the race, they are ugly and disagreeable. The horns of most are more or less annulated, and some species have four instead of two; a few, also, have them spiral, and extending very high above the head.

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\* The florin of Germany is worth about half a dollar.

The most remarkable of this class of spiral horns is the *Gazelle* (antelope dorcas), plate 10, fig. 3: has strong round horns, bending backwards; resembles the chamois in size and form; is of a yellow color on the upper surface of the body, and white on the lower, with a brown stripe on each side; and, although very timid, if attacked will show its horns to the enemy. They are found in the north of Africa.

The *Springbok* (antelope euchore), is from South Africa, and is much like the last-described, but has upon the back a fold of skin covered with white hair; this singular appendage expands at every leap, and has a most odd appearance.

The *Saiga* (antelope saiga) lives in southern Russia, is of a yellowish brown, with yellow horns; its upper lip is so long that in grazing it is obliged to go backwards. The flesh is not good.

The *Nyl-Ghau* (antelope tragocamelus) is a native of Cashmere, Bengal, and the interior of India. It is four feet in length and the same in height, with horns which project. Its color is a dark gray, and it has a mane and beard, in form and agility it much resembles a roebuck, and is a real ornament to the regions it inhabits.

The *Gnu* (antelope gnu) has curved horns, bending downwards like those of the buffalo, from behind which its large eyes peer out scornfully. Its short neck is adorned with a whitish mane, which stands up stiff and erect; the tail is white and flowing, and the animal, in its whole shape, much resembles the horse. Light of foot as a stag, the gnu seems to be an intermediate link, connecting the tribes of the ox, horse, and stag. It is the swiftest of the antelope tribe, is not easy to be approached within shooting distance, and when captured, is wild and intractable.

THE GOAT KIND.—(*Capra*.)

Animals of the genus goat have the horns directed upward and backward, the chin is covered with a long beard, and some have small protuberances on the throat, which are clothed with hair.

The *Wild Goat* (*capra ægargus*) has very large horns which are trenchant in front; they are much smaller in the female, and sometimes entirely wanting. These animals live in troops on the highest Alps of the Caucasus and on the mountains of India, and are larger than the domestic goat. Their color is a grayish red or brown, with a black face and tail; a dark stripe runs along the back, and a thick, brown beard adorns the chin. The horns are often two feet long, and weigh three pounds. The Bezoar stone, formerly considered of great value, and sold by empirics as a specific in many diseases, is a concretion found in their intestines. The wild goat is the original of the

*Domestic Goat* (*capra heicus*), which is smaller and has shorter horns. In length it is full four feet, in height two, and in respect of color they differ greatly from each other, as is well known. Its coat, on the outside, consists of coarse, bristly hairs, which covers another of fine and silky texture, and in many of the species the inner coat is so well developed as to furnish a valuable article of commerce. Some goats have no horns at all; on the other hand, males of other races, instead of two, have four; but, for the most part, horns are the usual appendage to the head of the male goat, and he bears them proudly. They are very capricious animals, unsteady and petulant; sometimes friendly, and at others the reverse; ap-

proaching strangers with a mixture of confidence and curiosity, and then again—particularly the males—malicious and tricky, butting the intruder and knocking him down. This last mentioned trait, as well as their agility in climbing steep roofs, hills, and high precipices, is well known. They are as changeable in their reception of food as in their humors, rejecting one day what they like on another; now eating the best of grains, next meal refusing every thing but straw. Lichens and moss from the rocks are the favorites of one meal, and for the next they will peel the bark from the young trees. Thus it is hard to accustom them to submit to domestic usages, and those who keep them complain that they do great injury to the plantations and shrubbery. They can endure heat and rain without injury. Damp and cold regions, however, do not suit them, nor do they thrive in such; and it is somewhat singular that, in the variety of herbage on which they feed, these animals seek out the poisonous hemlock and aconite, which they eat with impunity. On account of their mischievous propensity for wandering and climbing after forbidden things, they are troublesome domestic animals. The milk is considered nourishing and medicinal, and, considering the nature of the fodder, wonderfully rich and abundant; good cheese is made from it. The skin is made into leather, which is used for gloves. Cordovan and morocco is also prepared from it, and in the South and East they use the untanned hide for bottles to hold wine. The flesh of the kids is esteemed very palatable. There are mostly two at a birth, and being merry and playful little animals, are very amusing.

The *Cashmere Goat*, which is a native of Cashmere and Persia, has flat, spirally twisted horns, which stand



almost perpendicular, hanging ears, and under the outside coat of hair have an inner one of the most beautiful silk-like fur. The beautiful cashmere shawls of the East are manufactured from this inner coat, and are valued at extravagant prices, some of them bringing several thousand dollars.

The *Angora Goat*, plate 10, fig. 5, is distinguished by its long winding horns, tending rather horizontally, and fine, glossy, silk-like hair, which is mostly white. It finds its home in Lesser Asia. Its hair is spun into the yarn called mohair, and woven into the cloth known as camblet.

The *Bouquetin* or *Ibex* (*capra ibex*), has large horns, which are square in front and marked with transverse knots; are about two and a half feet in length, and incline backward. The body of the ibex exceeds four feet in length, and is two feet high; its color is ashen gray, growing redder as the animal increases in age; a dark brown stripe extends along the back; the beard is thin and short. The horns of the female are much smaller than those of the male. Like the chamois, the ibex lives among the high Alps. At the present day few are to be seen, the race being nearly extinct, as the danger-despising huntsmen, preferring them to the chamois, have pursued them to their furthest recesses. They are now found only in a few places in Styria and Savoy, and, occasionally, among the high mountains of Wales. Their manner of life is much like that of the chamois; they, however, are more agile, leap from crag to crag with greater dexterity and lightness, and possess the singular faculty of standing on the narrowest spot imaginable. With the whole four feet clustered together, on a space not exceeding a hand's breadth, they will often remain

immovable for many hours—sometimes half a day. It has been said that this animal, when pursued, will throw himself from the steepest declivities, and fall upon his horns in such a manner as to escape unhurt; this, however, is not true. The flesh of the young is esteemed superior to that of the sheep, being more juicy and tender. The skin, when tanned, makes excellent leather. In the present day, however, it is more frequently seen in the cabinet of the naturalist than in the currier's shop. Taken young the ibex becomes very tame, and demeans itself much like the goat. The chase is much more dangerous than that of the chamois, as the hunter must wander among the dangerous passes of the mountains often for days at a time before he comes upon the track, and watch whole nights before he is able to bring him within the range of his gun. Nor is this hardship and peril the sole danger encountered. He not only sets his life at hazard, but is liable, if found out, to be prosecuted, as, in order to prevent the total extinction of this beautiful animal, there is a prohibition against their being killed, and a heavy penalty imposed in case of its infraction.

#### THE GENUS SHEEP.—(*Ovis*.)

This genus is composed of animals whose horns are directed, at first, backwards, and then incline, spirally, more or less forward. They are without a beard, and much resemble goats, except that instead of hair they are covered with wool.

The *Argali of Siberia* (*ovis ammon*) is generally considered as the original parent of our stock of sheep. About as large as the goat; both male and female have

horns ; in the former they are triangular at the base, rounded at the angles, flattened in front, and striated behind ; those of the latter are compressed, and in the form of a scythe. The argali is found in great numbers in upper Asia, and in the mountainous regions of Siberia. Its summer coat is of a grayish fawn color, while that it wears in winter is thick and reddish gray. It feeds on all kinds of Alpine herbage. Its flesh is much esteemed as venison ; therefore it is frequently hunted, and when domesticated young, becomes as tame as a sheep.

The *Mouflon* (*ovis musimon*) much resembles the Argali, and is found in Corsica, Sardinia, and Turkey ; in size is scarcely below the above-mentioned ; it has an undercoat of short, woolly hair, which is covered with an outer one of longer and coarser. The mouflon is very timid, and found living in herds among the high mountains of Europe, Africa, and America. The young become very tame, but are fond of butting with their horns. The form of body and horns are like the argali.

The *Domestic Sheep* (*ovis aries*) is three feet in length, and two in height, and, except on the feet and face, covered with wool. The ram has large crooked horns ; these appendages are mostly wanting in the ewes. The sheep is a good-natured, but very stupid animal, which, as if conscious of its own weakness, has, from the earliest times attached itself to man, and, having wandered all over the earth with him, has become one of the most useful domestic animals. Not capricious, like the goat, and without any propensity to leap from rock to rock, or climb after forbidden things, the sheep obeys all the rules of domestic regulation, as an orderly animal should ; takes his food as it is given, follows the shepherd and his dog, so that it is but little trouble to take care

of him. Upon the whole, his demeanor is grave and quiet; the lambs, however, are sportive, and full of play; but after arriving at maturity, they all become so accustomed to order, that they will follow the bellwether closely, and imitate all his movements. If he leaps over a ditch, the whole herd will do so too; if a stick is held before the leader, and he jumps over it, every one in the flock, on arriving at that spot, will make a similar spring; in short, the sheep is a perfect emblem of obedience and patience. If the flock is left unhoused and involved in falls of snow, they place their heads near each other, with their muzzles downward, and crowd close together, so that the snow will form a kind of roof over them. Silly as sheep are considered to be, they are not without a certain kind of courage; for oftentimes, if one is in danger, the rest will not desert him, but falling on the enemy, drive him off.

The finer the wool, the more sensitive is the animal which bears it, to cold and damp weather, and much care is necessary in providing food suitable to keep up health. These finer breeds are very delicate, and do not yield as much wool, neither is their flesh as good mutton as those that wear a coarser fleece. The ewe brings forth one or two lambs about Easter; her milk, although not given in a large quantity, is uncommonly fine, and when the animal is well pastured, makes excellent cheese. Sheep are sheared once, and sometimes twice a year. A further description of this useful animal is unnecessary; it is well known how good and wholesome mutton is; the skin of the lambs is used as peltry; tanned, it makes parchment and soft leather; the intestines are manufactured into strings for musical instruments, and the tallow

into candles; in short, there is no part of this invaluable animal but is applied to useful purposes.

There are several remarkable races of sheep. The first is the fine *Merino Sheep*, which came originally from Spain, but is now raised and improved in Wurtemberg, Saxony, and Hungary, and all over the United States; the coarser farm sheep, which is common throughout all Germany, and a smaller species peculiar to Lüneburg. The *Iceland Sheep*, with its harsh thick wool, and many horns, having from three to five. The *Zackel Sheep*, of Hungary, with its spirally twisted horns, plate 10, fig. 7, with a fleece equally coarse and thick. The *Long-tailed Sheep*, of which the caudal appendage, long and slender, reaches almost to the ground, is found in Syria and Circassia; the *Broad-tailed Sheep*, a native of Persia, the Caucasus, Abyssinia and Syria, has a tail like a pillow. It is said to be a foot in length, and often weighing from twenty to thirty pounds, and that the shepherds are obliged to fasten a small board with wheels, in order to support them as the animal walks. The *Fat-tailed Sheep* is three feet high, and five feet long; the tail is very short, and consists of two lumps of fat, which weigh upwards of thirty pounds. Both races are many-horned; their size is greater than that of other sheep, and are everywhere met with in Mongolia, Persia, and China.

#### THE GENUS OF THE OX.—(*Bos*.)

The race of oxen comprises such animals as have the horns directed from the side of the head, and turn upwards or forwards in the form of a crescent. They are large, awkward animals, with moist upper lip, slobbery

mouth, short and stout legs, and long thin tail, ornamented at the extremity with a tuft of hair, or tassel.

The *Common Ox* (*bos taurus*) is characterized by a flat forehead, which is longer than it is broad; a sharp ridge separates it from the occiput, and from each side of this occipital crest also arise the horns, which differ greatly in size and form, according as they belong to different races, some few of which have no horns at all.

From the earliest ages the ox, together with the horse and sheep, has been domesticated with man; it is, therefore hard to conjecture whence he originated. Many believe the *Zebu Ox* or *Bison* of India to be the common ancestor of the race known to us. These are beautiful and well-proportioned animals, mostly of a snow-white color, but sometimes of mouse gray, and remarkable for having humps of fat upon the shoulders. How easily they are tamed into companionship with man, and acclimated to country, is exemplified in the little troop brought to Stuttgard, Germany.\* The wild oxen, kept in many English parks, much resemble the zebu, but are without humps. Their color is a foul white, the mouth black, the interior of the ears red, and the horns white tipped with black. They are fierce and untameable. On seeing any one approaching, the whole troop will run away at full gallop, but having secured a distance of two hundred paces, they will return boldly, and defy the intruder by shaking their heads threateningly. With seeming courage and audacity the wild will quietly face the enemy at a distance of forty steps, but at the slightest movement made by him, they will fly off as rapidly as at first, although not to so great a distance,

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\* The *aurochs*, has no hump; the *Zebu* is a smaller variety of the *Bison*.—BUFFON.—*Tr.*



but almost instantly advance to renew hostilities. Repeating their former threatening motions, and circling round as before, growing bolder every moment, the circuit is gradually narrowed. Thus advancing the danger becomes imminent, and the object of vengeance, whether traveler or huntsman, valuing his own safety, is glad to withdraw to a place of covert.

The principal uses of this animal are well known, and in all countries they are prized on account of their excellent flesh, hides, and milk. In southern lands, as they furnish less of the last-named article, they are more used for draught than with us. In one part of Upper Asia the inhabitants ride upon oxen; as soon as the animal is old enough to be mounted, a hole is bored through the cartilage of the nostrils, and a piece of wood is passed through the opening to serve as a bit. A cord fastened at each end of this bit forms the reins of a bridle, a saddle is placed on the back, and all is ready for the rider, who mounts and uses him instead of a horse. Many of these animals, notwithstanding their seeming unwieldiness, are handsome, and in harness persevering as horses.

Among all civilized nations the ox species is very kindly treated, being considered the most important domestic animal of the farmyard. They differ greatly in form and color; the reddish brown are mostly preferred as being the best. The cows of England, Holland, and Switzerland are considered superior to all others of the race. The beauty of his cows is a source of great pride to the herdsmen of the Alps; the handsomest of the flock is honored with the largest bell, those next have smaller, and it is singularly interesting to observe how proudly these animals bear themselves, as

they go to the meadows, as if sensible of the distinction bestowed by the bells. If the bell is taken from the neck of one and placed on that of another, it occasions a serious battle, and if the badge of honor is not restored to the original possessor, she is so troubled that she refuses to eat. All of the race are fond of music, and the herdsman of the Alps, as he drives them to the pastures, animates the herd by a merry song. These animals feed mostly on grass and clover; they will, however, browse on almost any herbage. In winter they are fed on hay, roots, malt, or grains from the distilleries, etc. The calves are very lively, and come into the world with four milk teeth, are able to eat green fodder in a few weeks, and soon have horns. Both cows and calves are very gentle and affectionate creatures; the males are, nevertheless, often very fierce, and have sometimes been known to attack their masters, and when enraged, will rush madly upon an opponent, and gore and toss both man and beast with their horns. Like all other animals of this species, they are displeased at a red color, and dislike horses so much, that they will follow a rider. The Spaniards, who are fond of bull-fights, take advantage of these natural antipathies, and bring both before the animal, in order to excite them to a greater degree of rage.

The bull-fights of Spain have often been described. One of the handsomest bulls is brought into the circus, where the public are assembled, and riders, mounted on fleet and well-trained horses, carrying red flags, advance in front and provoke him until he bellows with rage, tears up the earth with his horns, and makes a rush at the enemy, which they well know how to avoid by swaying their steeds on one side. After repeating these irri-

tating movements several times, they vanish through a timely opened door, leaving the sport to be finished by others. The matadore next approaches on foot with a red blanket in his hand, which he throws over the animal's eyes, and as, at this time, they are in close neighborhood, he springs aside to escape a collision, which would be dangerous. For the next few minutes he stands in the middle of the battle place, and quietly awaits the approach of the savage animal, that now, foaming with rage, comes threateningly towards him. At the very moment that the bull sinks his head to the earth, preparatory to flinging his foe in the air, the matadore, with sure and steady hand, plunges his knife in the animal's neck, and in a moment he lies dead at his feet. Should he not venture this dangerous stroke, or should it not succeed, he steps quickly aside, and buries a dagger in the heart.

The ox is of the greatest importance in the uses of domestic life. Powerful and docile, he draws the cart or plow, and his flesh, tallow, horns, hide, and hair are of infinite value to his owner. The milk of the cow yields cream, cheese, and butter. The caillette or fourth stomach of the calf is applied to a singular use; stretched on a hoop, it is dried carefully, and a small piece put into a quantity of warm, sweet milk, forms it into the curd of which cheese is made. A well-fed ox frequently will weigh from five to eight hundred pounds, sometimes, although rarely, more. The breeding and raising of cattle is of much importance, and embraces a peculiar branch of study.

The *Aurochs* (*bos urus*) is the *Wiesent* (*bonasus*)\* of

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\* Buffon.—*Tr.*

the primitive Germans—the bison of the ancients. It is six feet in height, and ten in length; its forehead is arched and broader than high; and the male is distinguished by having a crest of curly wool on his head, which also covers the neck like a mane. His voice is a kind of low grunt, his horns short and very strong, and his body is of a dark brown color. The aurochs are wild, intractable animals, which can not be tamed. They are shy and timid, and, now almost extinct, have withdrawn to the great marshy forests of Lithuania. They are somewhat dangerous, and will attack travelers; horses have a great abhorrence of them, and fly off at full speed at the approach of an aurochs. The flesh is strongly impregnated with the odor of musk, nevertheless that of the young is considered excellent venison, if steeped in wine or vinegar previous to cooking. The skin makes a kind of spongy leather, and therefore is not used. The forests in which the aurochs have taken refuge, are the property of the Russian crown, therefore it is against the law to shoot one without the permission of the Czar. Their usual habits are much like those of the common ox species.

The *American Bison*\* (bos bison) or (bos americana)

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\* The peculiar distinction of the American bison (erroneously called buffalo) is its singular hump on the fore-shoulders; it is of an oblong form, diminishing in height as it recedes. The eye is black and brilliant; the horns are black and very thick towards the head, whence they curve upward, rapidly tapering towards the point. The physiognomy of the bison is menacing and frightful; this ferocious appearance is, however, but a delusion and an outward show, since, of all his species the bison is the most pacific and inoffensive. The flesh is like coarse-grained beef, but more juicy, and tender in the highest degree. The favorite portion is the hump, which, when cooked in the Indian fashion, by sewing it up in the hide, singed and denuded of hair, and baking it in an earthen oven, wherein a fire has been previ-

resembles the aurochs in figure and general characteristics, but his legs are shorter and his mane thicker and longer. This fierce and intractable animal inhabits the thick forests in the southern portion of North America.

The *Buffalo*\* (*bos bubalus*). It was only in the

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ously kindled, and over which a second fire is kept burning during the process, is considered the most exquisite of dainties. The tongue and marrow-bones are also greatly prized; and it is too often the case that the American hunter on the prairie, in the very wantonness of epicurism, kills fat cows by the score and hundred, and only taking the tongues, leaves the carcasses to rot on the plains, to feed the vulture and the wolf. This habit of indiscriminate destruction is rapidly depopulating the continent, its woods, its wastes, and its waters, of its choicest inhabitants; and it is supposed that, vast as are their multitudes, they decrease so rapidly that but few years can elapse ere they will be extinct. Their original range appears to have been the whole of the North American continent west of Lake Champlain and the Hudson River, with the exception of some intervals on the Atlantic sea-board and south of the Ottawa and Columbia rivers, northward of which its place is supplied by the musk ox, as is that of the elk and moose by the rein-deer. They are used to travel, when migrating, in solid columns of thousands, which it is almost impossible to turn or arrest. For many years they have ceased to exist eastward of the Mississippi, and every year drives them further toward the setting sun, which seems to be emblematic of their future as that of the red Indian, the noblest savage man the world has ever produced, who, *pari passu* with the wild herds which were the main support of his people, is traveling the road to certain extinction.—*CYCLO. AMER.—Tr.*

\* Buffalo, the name of two species of the true oxen, as distinguished from the bisons, to which they bear at best a faint resemblance, though they are included with them in the genus *Bos* (Linn). This animal must on no account be confounded with the American bison (*bos Americanus*), which is almost universally called the buffalo, as its furry hides, prepared by the Indians, are called buffalo-robcs. The two species of the true buffalo are the *Bos Bubalis* of India (Linn) and the *Bos Caffer* (Sparm.) of South Africa. They are called on both continents simply the buffalo, but are separated zoologically as the Indian and Cape buffalo. In India the buffalo is again subdi-

fourth century that this animal was brought from India and transplanted in the south of Europe, for the wild ox known to the Greeks and Romans as the *Bubalus* or *Bubalis*, was not the buffalo, but a species of antelope. He is larger than the domestic ox, with a large, clumsy head and arched forehead; his horns are round, short, crescent-shaped, and bend backwards, and his body is covered with thin hair of a brownish black. He has a malicious look; his head is always inclined towards the ground; his whole appearance is savage and threatening, and, in spite of all man's efforts to tame him, remains obstinate and dangerous. The buffalo can not live in a cold climate; nevertheless they thrive in Italy, Greece, and Spain, where they are valued not only as draught animals, but on account of their milk. They are very fractious; therefore it is necessary to pass a ring through the nose, in order to lead them. They are fond of swamps and mudholes, and wallow in the thick mire, like hogs.

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vided into wild and tame, although they are the same species. Mr. B. H. Hodgson, who has done much for the zoology of India, says of them: "The *Chainsa*, or tame buffalo, is universal in India. The *Bos Arna*, or wild buffalo, inhabits the margins rather than the interior of primeval forests. They never ascend the mountains, and adhere, like the rhinoceros, to the most swampy sites of the districts they inhabit. There is no animal upon which domesticity has made so small an impression as upon the buffalo, the tame being still most clearly referable to the wild ones frequenting the swampy jungles of India. The arna lives in large herds, is much addicted to wallowing in the mud, is a fierce and vindictive animal, and in its native jungles is more than a match for the Bengal tiger. The wild buffalo is one-eighth larger than the tame, measuring ten feet and a half from snout to vent, and is of such power and vigor as by his charge frequently to prostrate a well-sized elephant. This species was introduced into Egypt, Greece, and Italy during the middle ages. Its great strength makes it peculiarly adapted for draught. Its milk is good, its skin highly valued, but its flesh is much inferior to that of the ox."—*Tr.*



A herd of buffaloes can only be kept in order by a guard of mounted keepers, armed with lances. The female gives milk of an excellent quality, of which butter and cheese is made; the quantity is, however, but small. The flesh of the young buffalo is very good and palatable, that of the old tough and hard. The hide makes leather of excellent quality, and the horns are manufactured into various articles.

The *Cape Buffalo*\* (*bos caffer*), plate 12, fig. 3, has very large horns, which are placed close together and flattened at the base, broad, rough, and sinuously ridged, covering the whole front with a sort of horny helmet, with a smooth tip curved upward and inward. Like the above described, it is about the size of a large domestic ox, and is a fierce and savage animal, the chase of which is always attended with danger. It is found at the Cape of Good Hope and Caffraria.

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\* The *Caffer* or *Cape Buffalo* is a native of all South Africa. It congregates in immense herds, but the old bulls, which become quite gray and are often almost destitute of hair, sometimes adopt solitary habits, when they grow very morose and savage, attacking both men and animals in mere wantonness, and when killed, trampling and kneeling on the carcasses, and crushing them with their horns and massy frontlets until every bone is broken. Gordon Cumming, in his South African wanderings, gives many accounts of this powerful and savage brute, which has not the power of defending himself against the lion, as his Indian relative has against the tiger, but, on the contrary, often falls a prey to him by open attack. All travelers dwell on the loud bellow which he utters in the death agony. There is an Indian wild bull (*bos gauroes*), little known, which appears to be intermediate between the bison and buffalo. General Hardwicke and Captain Rogers describe it as a genuine bull, neither bison nor buffalo, but, Major Campbell, who gives a full description of this rare animal, which he calls the *Jungle Rhoolga*, makes it out clearly a bison; but it is presumed that on further investigation, it will be elevated into a distinct genus.—CYCLO. AMER.—Tr.

The *Musk Ox* (*bos moschatus*) has horns like the foregoing, is scarcely as large as a small cow, and covered from head to foot with long hair. It diffuses so strong a smell of musk that the flesh can not be eaten. Its dwelling-place is in the polar regions of North America. The Esquimaux make caps of the tail, the hair of which falling over their faces, gives them a frightful appearance.

The *Yack* (*bos grunniens*) is as small as the musk ox, and is principally distinguished by having a sweeping tail, covered with long hair, like that of the horse. His tail is highly valued on account of its beauty, and, worn as a badge, constitutes the standard of rank to distinguish the superior officers of the Turkish and Chinese Empires.

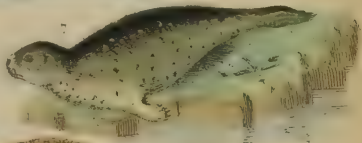
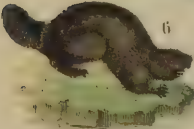
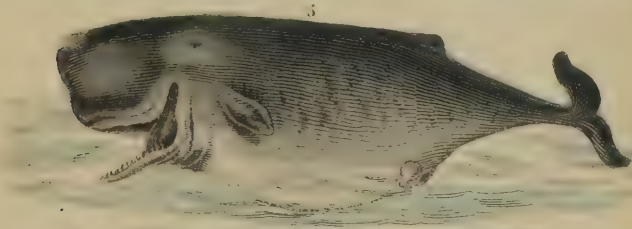
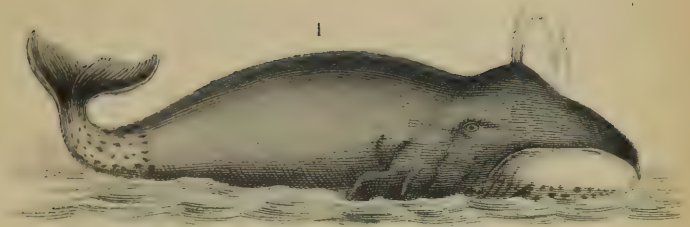
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## NINTH ORDER.

### THE WHALE.—(*Cetacea*.)

All the animals designated by the term *Cetacea* differ from the other mammals by the want of the posterior extremities, and having their fish-shaped bodies terminated by a broad, cartilaginous, horizontal tail. The neck is so short that the trunk is seemingly confounded with the head; the anterior extremities, in relation to the large head, are so short and so deeply enveloped in folds of skin, that they have the appearance of fins. Although these animals much resemble the fish tribe externally, yet an essential difference is found to exist between them, inasmuch as the former have coarse bristles on various portions of their thick skins, that they respire through the medium of lungs, that their young are born alive

13.





and suckled from a mammary apparatus, that their blood is warm, and their internal structure is arranged like that of the other mammalia.

This order is divided into two families—*Herbivorous Cetacea* and *Cetacea Carnaria*.

### I.—HERBIVOROUS CETACEA.

The animals of this race lose their incisive teeth while very young; they have no canines, and the molars, like those of all herbivorous animals, have flat crowns; they have a stumpy head, with protruding, cow-like lips, and, from a habit they have of raising the anterior portion of the body clear out of the water, navigators, seeing them from a distance, have imagined a remote resemblance to the human species. This fancied likeness has formed a foundation for the fabled sirens and tritons of the ancient times, the mermaids of the modern. The principal genera of this family are the *Lamantins* and *Dugongs*.

The *Sea Cow* (*manatus americanus*),  $\frac{2}{2}$ ,  $\frac{0}{0}$ ,  $\frac{8}{8}$ . Their oblong body is terminated by an elongated oval fin; their anterior extremities enable them to crawl on the sea shore and carry their young. They are sometimes twenty feet in length, and reach a weight of eight thousand pounds. Their gray skins are, here and there, provided with a covering of hair, and each side of the fleshy muzzle is furnished with coarse, stiff bristles. The udder is on the chest. They live in troops on the sea shores of South America, near the mouths of rivers, which they ascend for a considerable distance in quest of sweet water. Their food consists of all kinds of aquatic plants. They display great affection for their young, nurse them tenderly, and guard them carefully from the aggression of

enemies. The flesh is white and as well tasted as the best veal, and their fat rivals the finest butter.

An animal, bearing considerable likeness to the laman-tin, or sea cow, is found in Africa.

The *Dugong* (halicore dugong),  $\frac{2}{2}$ ,  $\frac{0}{0}$ ,  $\frac{6}{6}$ , resembles the foregoing except that it is much smaller, seldom reaching a length of more than eight feet, and possesses the incisive teeth. The skin is of a bluish color, with irregular black spots. They inhabit the shores and bays of the Indian seas, where they live in pairs, and are so affectionately fond of each other, that even in danger of death they can not be separated; and the natives declare, that when the female is robbed of her young, she will shed tears like a human being, and that, if taken young, they can be tamed and domesticated.

## II.—CETACEA ORDINARIA, or CARNARIA.

The Cetacea of this group are distinguished by having the nares on the top of the head instead of above the mouth, so that the great mass of water taken into that immense mouth is thrown out of the nasal fossæ in jets like those of a fountain. They also enable the animal to breathe the air without raising but a small part of his body out of the water. They are entirely without hair, but their whole body is covered with a smooth, flexible skin, directly under which lies a thick layer of fat, which makes them objects of pursuit. They are divided into Small-headed Cetacea—those whose heads are in proportion to the rest of the body, as the Dolphin and Narwhal; and the Large-headed, with heads constituting a half or third part of the body, as the Cachalots and Whales.



The teeth, where they exist at all, are in indeterminate numbers.

*Small-headed Cetacea.* The Dolphin, which belongs to this class, in its general form much resembles other fish, living only in the sea, and very seldom approaching lakes or rivers. Their teeth are small, of a conical form, and sharply pointed. The muzzle is pointed, and forms a sort of beak; the forehead is convex. The specimen of this class best known is,

The *Common Dolphin* (*delphinus delphus*). It is black above and white below, and measures in length from eight to ten feet. These animals are celebrated for their amusing gambols and evolutions on the surface of the water. They are also swift sailers, and often follow ships in shoals, playing under the bows and throwing jets of water from their spiracles, which are on a line with their eyes. They accompany vessels, however, more on account of the scraps and kitchen refuse thrown overboard than from attachment to the society of man, and greedily prey upon the fish attracted by the same bait. When they are seen playing through the waves in large numbers, it is believed to portend stormy weather. They utter cries resembling shrieks or groans, rather than the ordinary tones of other animals. Much was said by the early naturalists respecting their fondness for music and disposition for sociability with man, as well as capability of being tamed. Those of a later day, however, have failed to discover those traits of intelligence, and it is more than probable that the perfection assigned to the dolphin in the days of ancient Greece, had its origin either in the poetic imaginations with which men loved to invest events, whether real or fabulous, in order to express moral precepts, or from confounding their usages with those of the

seal. There are many relative species, which greatly resemble each other.

The *Narwhale* or *Sea Unicorn* (*monodon monocerus*), plate 13, fig. 4,  $\frac{2}{3}$ ,  $\frac{3}{4}$ ,  $\frac{5}{6}$ , has barely two cutting teeth in the upper jaw, of which one, mostly the right, remains undeveloped, whilst the other acquires a very considerable length, sometimes reaching nine feet, and is generally furrowed spirally. It is often found wanting in the females. The narwhale is an active, sociable, and lively animal, growing to sixteen feet in length. Its skin is of a whitish brown, but in age changes to a marbled white. It inhabits the North Sea, and is fond of being in the neighborhood of the whale, and as it never contends with these great monsters of the deep, as has been fabulously asserted, but sports freely in their society, the Greenland fishermen are glad to see it, as they consider it a sure forerunner of the whale. The narwhale feeds upon all kinds of fish, snails, etc. It is not known whether they swallow their food without mastication or not; some believe they take and retain the larger animals of their prey on their single tusk or horn, and devour them at their convenience. They are very seldom taken by the fishermen, who care little for them, as they yield no blubber; their tusk, however, is considered as good as ivory, and the Greenlanders use it for making hunting spears and other implements of the chase. They also eat the flesh, together with the fat and skin, and make good sewing-thread from the tendons.

*The Great-Headed Whale.* The head of this species makes a third or rather a half of the whole body. They live constantly in the water, and are divided into two classes, viz., those having teeth, and those which have whalebone instead.

The one best known and belonging to the first, is the *Cachalot* (*physeter macrocephalus*), plate 13, fig. 5. These cetacea are remarkable for their enormous and disproportioned heads, in which are found an oily substance (adipocire); this, on cooling, becomes fixed, and is well known by the name of *spermaceti*. On first opening the chambers in which this oil is contained, it is altogether liquid, but soon congeals by contact with the air. Those cells, or chambers, found in the cavity of the huge head, communicate by canals from the muzzle to the different parts of the body. Besides *spermaceti*, the *cachalot* yields ambergris. This is an odorous, wax-like substance, found floating on the surface of those seas they inhabit, and is supposed to be a morbid secretion formed in the intestines of the animal. Ambergris is well known and is used partly as medicine and partly as perfume. The length of the *cachalot* is from seventy to eighty feet, and is the most voracious of the whale species, devouring dolphins, sharks, and even young whales, so that all the dwellers of the deep fly from before this formidable robber. He is found in all the large seas of both north and south. There are different species, some of which have the dorsal fin, and others only a callous protuberance in its stead.

The *Genuine* or *Bearded Whale* (*balæna mystecetus*), plate 13, fig. 1, is easily recognized from all others of the species by the absence of teeth, instead of which the upper jaw is furnished with whalebone. This name is given to great horny plates of fibrous texture, which are very elastic and fringed at their edges; these placed transversely, lock one into the other, and form a sort of great sieve, through which, as soon as the jaws are closed, the water taken into the immense mouth escapes, with-

out, however, carrying with it the small animals on which they feed. The tongue lies immovable in the cavity of the under jaw, and the throat is so narrow as scarcely to admit of swallowing a herring. The shape of the body is like that of others of the species. The mouth is curved and extends almost behind the eyes, which are disproportionately small. Sixty and seventy feet is found to be the usual length of these creatures; they are said to have been found much larger, but these are exaggerations. The spiracle or spout-hole is placed in the middle of the head, and enables these creatures to throw out, through the nasal fossæ, those great masses of water they take into their huge mouths along with their prey. This is done, forming a jet like that of a beautiful fountain, often reaching a height of forty feet. Notwithstanding this species does not in length equal some others of the race, they make up for the deficiency in rotundity, their bodies often measuring fifty feet in circumference. Their color is bluish black, shaded into gray, or marbled on the back, but yellowish on the lower surface of the body. The outer skin is not thicker than parchment, and covers a thick layer of fat or blubber, which surrounds the whole body. This last-named is often several feet in thickness, is of a white color, and, being very light, swims if thrown into water. From this blubber the well known sperm oil is extracted, either by pressing or boiling; that which runs from the fat without either process, is considered the best, and is as clear as olive oil. One whale has been known to yield sixty thousand pounds of blubber. The greatest weight to which this animal attains is two hundred thousand pounds, equaling that of thirty elephants or two hundred oxen. Besides this three thousand pounds of whalebone

has been obtained from a single whale, so that the profit arising from the pursuit of the cetacea tribe, or even from one large specimen of the tribe, is very great. The Greenlanders and Esquimaux eat the flesh; and it is said that that of the young whale, when properly dressed, tastes like coarse beef.

Whales are found in companies, but mostly in pairs. The love of the female for her young is so great that she will brave every danger in their stead, placing herself between the harpoon of the fisherman and her offspring, and attacking the pursuer with great fury. They swim with great ease. The layer of fat in which their ponderous bodies are enveloped, making them lighter than the water, they can float upon the surface seemingly without exertion. Their motion is, however, slow, but when pursued, they can swim as rapidly as a ship sails; and they are often seen floating lazily on the surface of the water, spouting their jets aloft like so many fountains. This operation is attended with a noise which may be heard at a long distance. Their hearing is dull, their sight very sharp under water; their bodily strength may be imagined, since it enables them to spring many fathoms high or dive to the lowest depths of the sea, at each effort bearing a volume of water equal to four million quintals; and such is the strength of the tail, that one stroke from it will upset a boat. Their ordinary food consists of small mollusca, or crustacea, a few lines in length, and zoophytes, which are found in such immense numbers in the Polar seas, that the water may be said to be literally filled with them. They are very voracious, and their manner of feeding quite easy—swimming leisurely, they have only to open their huge mouths long enough to be filled with water, and on closing their jaws,

such is the singular apparatus provided by Nature, the water is spouted through the spiracle or blow-hole, and the mollusca, sifted through, as it were, are swallowed. Whales are, for the most part, timid and fearful, never attacking unless provoked, and it is only in self-defense that they become furious and deal destruction on all round by striking the water with their powerful tails. Notwithstanding the difficulty and danger inseparable from the fishing for whales, men engage in it readily, and venture in frail boats to brave the rigors of the Northern seas, in order to battle with and conquer the colossus of the deep.

Whale-fishing is conducted as follows : A ship, fitted out for the purpose, sails in the summer towards that point in the Polar regions where whales are supposed to be found. Great risks are often run from meeting with or being crushed by icebergs ; but, undaunted in the pursuit of gain, the hardy seaman despises fatigue, privation, cold, and danger of shipwreck, and carries on his work without fear. A sailor is placed in a lookout at the masthead in order to watch for whales. As soon as one is discovered, a signal is given, and the fishermen prepare for active duty. Two boats are hastily, but silently, manned, and steer cautiously towards the place where the monster is floating ; and in the meantime, the portion of the crew left in the ship is preparing for his reception. The best oarsmen row the boats, in the bows of each an experienced fisherman stands erect, holding a harpoon in readiness to throw it as soon as within striking distance. This harpoon is a species of javelin, about three feet in length, the deeply barbed head of which is attached to a strong cord and of sufficient length to allow the movements of the whale. This cord is coiled up in



the bottom of the boat, and when the harpoon is discharged, is run out over a wooden roller, so that it can not become tangled or hitch ; as its motion is so rapid, sailors have sometimes been caught in a loop of the swiftly-running cord, and thrown into the sea or crushed to death. The second boat is manned in the same manner, and in case both are too small to carry the requisite amount of rope, another is dispatched from the ship. All are furnished with long lances.

It is not easy to approach a whale, unless he is sleeping, in which case he lies in the form of a bow and with the vulnerable parts of his body above the water. Swiftly, but with muffled oars, the boats come up on the concave side of this monarch of the ocean, and, when within striking distance, the fisherman throws his harpoon. The boat is now obliged to pull back to the other side, lest the first movement of the wounded animal—always a stroke from the tail—should upset it. Finding himself wounded, the whale flies from his enemy with great violence, sometimes descending perpendicularly into the depths of the sea ; and so great is the force of this descent that, it is said by the whalemén, the under jaw is shattered against the rocks in the bottom. The cord now runs so swiftly off the roller, that the rubbing on the side of the boat would cause it to take fire ; it is therefore necessary to wet it all the time it is paying out. Great care is requisite in keeping the rope properly coiled in the boat, for if it runs out irregularly, there is danger of its dragging the boat under water. In order to save as much giving out of rope as possible, the fishermen row very swiftly, for, if it breaks, which it often does, and especially when the whale plunges under an iceberg, all is lost. The poor

animal seldom stays more than ten minutes under water, but again comes up to blow; he is now struck with another harpoon, and, maddened with pain, he lashes the water into foam, and if sorely wounded, spouts up blood through the spiracle. Exhaustion prevents much farther rising or sinking, and he soon after succumbs to his enemies in the boat, which, keeping within a safe distance until the creature is thus too much enfeebled for further resistance, is now steered close to him, and the fishermen dispatch him with their lances. Blood and oil now gush from his wounds, so that the water round the floating carcass is dyed red. A flag is hoisted on one of the lances lodged in his body; this is the signal of conquest, and by the united strength of the victorious fishermen, the whale is dragged to the ship, which all this time has remained within safe distance from the dangerous chase. All is in readiness on board; barrels are prepared for the blubber, and the men, provided with irons on their feet to prevent their slipping, and knives in their hands, get on the body of the whale, and cut off large pieces of blubber, which are hauled up at the capstan or windlass. In proportion as the large pieces of fat are cut off, the rest of the crew are employed in slicing them smaller, and putting them on board, and those who have remained on deck cut them once more, and pack in casks, ready, on their return home, to be boiled into train oil; and this concludes the dangerous chase.

The *Fin Fish* (*balæna physalus*) resembles the whale, differing only by having the dorsal fin; is smaller in circumference, and yielding less blubber; the length of some, however, is greater, often reaching to one hundred feet. It is the skeleton of this species which, for a long time, was exhibited as a natural curiosity. His move-

ments are violent and furious, and, on this account, the chase is dangerous and the profit too small to make it desirable.

There are many other families of whales, which, in form and habits resemble those already described, and it is a not less interesting than imposing sight to see these monsters of the deep quietly swimming on the calm sea, spouting their lofty jets as if in the peaceful enjoyment of an undisturbed realm. The jets of water spouted by the large whales are often thrown to a height of twenty feet; they never ascend perpendicularly like those of a fountain, but are always directed obliquely forward.

## CLASS II.

### BIRDS—ORNITHOLOGY.

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BIRDS, like the mammalia, have red, warm blood; they breathe through lungs, whose bronchiæ and pulmonary cells communicate with the great cavities, and the air, passing through them in this manner, penetrates to all parts of the body, even into the interior of the bones and feathers, differing in this respect from the bronchiæ of the mammalia and reptiles, which terminate in little cells, and all end in a cul-de-sac, so that the air can not pass beyond it. By this ingenious arrangement the body is rendered lighter, as they can admit only so much air as is necessary. Their bones are uncommonly hard, light, and without marrow. While, in mammalia, the trunk is movable, in birds it is altogether rigid, forming a kind of inflexible aerostat, on which the wings, serving as oars, move lightly and freely. On the other hand, the neck, which, in the mammalia, numbers only seven vertebræ, is provided with many vertebral joints, varying from nine to twenty-three, by which the neck may be easily moved in all directions. The head terminates in a hard bill or beak, and serves admirably for bruising, breaking, or selecting their food, according to its nature. This consists of flesh, grains, seeds, or insects, which they pick up from the earth or out of

clefts in the bark of trees. The mandibles, or jaws, are composed of many pieces, larger or smaller, and are enveloped in a horny substance, which takes the place of teeth. As birds never masticate their food, so, with few exceptions, they are unprovided with the fleshy tongue peculiar to the mammals; such birds, however, as feed on grains or other hard aliment, have, in place of teeth, a remarkable internal arrangement which amply compensates for the defect; this consists of a strong, muscular stomach, commonly termed the gizzard, and the crop, or craw. The crop is formed by an enlargement of the gullet, in which the corn is first received, in order to be softened before it passes into the second stomach—the gizzard—the inner walls of which are lined with a cartilaginous skin, where the food is trituated, and in order to facilitate this operation, many species of the feathered race swallow gravel stones or grains of sand. This can easily be seen on examining the stomachs of geese or chickens.

The feathers, however, form the great distinguishing mark between birds and all other animals. These, which are changed twice every year, consist of a quill embedded in the skin, the shaft of which projects beyond it, and, armed with beards or barbs, which themselves have still smaller beards upon them. These, which are called *barbules*, are fine, fringe-like vessels, and underneath are little appendages, like teeth; these are the secretory organs. These feathers are, in most birds, of different colors; in some they are plain, in others they have the prismatic hue of mother-of-pearl; but in all they are beautiful, smooth, and shining, kept so by the constant dressing of them, which task the bird performs with his bill. The oil used for this purpose is secreted in a little

sac on the extremity of the body. The feathers are differently formed, according to their different uses; the large, stiff feathers found on the wings are called pinion or wing feathers, and are arranged one over the other, like those of a fan, so as to oppose, when the wing is spread, an elastic surface to the air. Those forming the tail are smaller, and are considered to act as a rudder; those of the wings are termed *remiges* or *oars*, as it is by them they cleave the air; those on the tail are called *rectrices*, because by them the bird may alter his course as he pleases. Nevertheless the wings perform an important part in the direction of this aerial sailing, as is easily seen in the case of birds when the feathers of one wing have been cut off. A third kind of feathers are those which cover the body, with the exception of the feet, and serve not only to protect it from cold and damp, but are also powerful agents for locomotion. In birds who live much in the water, as well as those that are natives of northern climates, a covering of down found under the outer integument, shows the wise provision of Nature for the peculiar need of all. These feathers, which often surpass the most brilliant flowers and gems in beauty and splendor, are infinitely varied, and serve to mark the different races; not always, however, in the same degree; generally the plumage of the female is not so rich as that of the male. The feathers on the head, and those composing the tail are mostly the finest, as, for instance, the beautiful plumes and crests of the peacock, bird of paradise, and others. The male is in every case thus distinguished from the female, by the greater beauty of his plumage; in some races the summer garb differs greatly from that worn in the winter; in the *Rapaces* or birds of prey, the female is larger



than the male, and in the singing birds the song of the male is more melodious than that of his mate.

Birds are divided into three classes; first, those remaining always in one region, where they find suitable food throughout the year—others, who in winter go away to seek a warmer climate; these wander near home, wherever they can find sustenance; and it is remarkable in birds of this class that the female only migrates, the male remaining at home; the chaffinch is an example of this fact, and it is stated by German naturalists that whilst the males always remain in Suabia during the winter, the females are found wandering along the Rhine. The third class embraces the real *Passerinae*, or migratory birds, which, driven either by an instinctive impulse foretelling a scarcity of food in winter, maintain an annual journey towards the southern regions, as Italy, Sicily, and Africa. Most of them travel by night, a few by day; some in small companies, others in great troops. Some observe the greatest order in their line of march, flying either in angular lines, or cleaving the air in the form of a long triangle. The autumn migration commences in the latter part of August, and continues two months; that of the spring begins in March and ends in May. In many of the races, the male birds come a fortnight before the female, and it is remarkable how many, after these long migrations, return for a series of years to their old resting places.

The most acute sense possessed by birds is that of sight, and by a particular mechanism of the eye, they are able to discern their prey from an almost immeasurable distance, with the same facility as when near the body. The hearing, except in the case of owls, is in

less perfection, for birds do not possess any external ear; the nocturnæ, however, have an equivalent in a large *concha*, but it is not projecting, and is so fringed by bearded feathers as to be effectually concealed. The sense of smell is mostly well developed, since birds of prey are directed by it to the place where booty is to be found when at too great a distance for them to perceive it, notwithstanding the great perfection of their sight. The sense of taste is rather obtuse, at least it is much less acute than that of the mammals, as the tongue is mostly hard and horny. The sense of touch, also, is dull, on account of the nature of their integuments; besides, their feet are rather fitted for walking or climbing, than touching. It may be observed, however, that ducks and geese form an exception to the rule, as they find food in marshes and mud-puddles by their bills only, and entirely unaided by the faculty of sight. The feet are protected, on the lower surface, by a hornlike skin; on the upper they are enveloped in hard scales, which guard them from injury when climbing up rough trunks of trees, or craggy places. All birds, without exception, are *oviparous*, that is, they lay eggs from which their young are hatched. Over these the parents brood, and provide for their unfledged offspring, after they have come forth, with most affectionate assiduity, until they are able to seek food for themselves. A few, however, proceeding from eggs left to be hatched by the heat of the sun, no sooner leave the shell than they are able to run about and find aliment for themselves. The young birds are at first covered only with soft down; the genuine feathers first appear when it is time they should seek their own sustenance. The ingenuity with which birds construct their nests is truly wonderful, and is

only equaled by the marvelous instinct, which, while it teaches them how to build those beautiful little structures, also directs *where* they shall be placed so as to be remote from danger, and safe from intrusion of enemies. Some, indeed, deposit their eggs upon the naked rocks, but even these manifest some maternal solicitude, for they pull the feathers from their bodies in order to make a soft resting-place for the expected brood.

Birds are classified, partly according to the disposition of the beak, and partly from conformation of the feet;\* for, as differing less in bodily structure from each other than the different mammals, their classification is founded chiefly upon the modifications that are to be remarked in the organs of mastication and prehension, or those of locomotion, which are the beak and feet. Such as seize and feed on living prey are recognized by a sharp, crooked beak, rather short but very strong feet, armed with powerful hooked nails. These form the order of *Rapaces* or *Accipitres*. Others, which live entirely on

\* The principal characters by which these groups may be distinguished from each other, may be seen in the following table.—  
RUSHEN.—*Tr.*

|        |                                                                                     | Orders.                                                                      |                                                                                                                                                     |                                                      |            |
|--------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|------------|
| Birds. | Terrestrial, the feet of which are not formed either for swimming or wading, having | Talons very strong, armed with pointed, hooked nails; beak hooked and sharp. | RAPACES, or ACCIPITRES.                                                                                                                             |                                                      |            |
|        |                                                                                     | Toes feeble and not armed with sharp hooked nails.                           | Beak generally pointed and not vaulted above; wings generally long, and body erect.                                                                 | A single toe directed backwards, and three forwards. | PASSERINÆ. |
|        |                                                                                     |                                                                              |                                                                                                                                                     | Two toes directed backwards, and two forwards.       | SCANSORIE. |
|        | Aquatic, the feet of which are formed for                                           |                                                                              | Superior mandible arched or vaulted, nostrils partly covered by a short, inflated scale; gait heavy; wings short.                                   | GALLINACEÆ.                                          |            |
|        |                                                                                     |                                                                              | Wading, the posterior part of foot long, lower part of leg naked.<br>Swimming, the toes being palmate; legs short, and placed far back on the body. | GRALLATORIÆ.<br>PALMIPEDES.                          |            |

grain or insects, require slender beaks, and lighter legs and feet, to enable them to hop about among the trees, or on the earth. These constitute the order of the *Passerinæ*, and embrace many families, among which are those of the warblers.

Birds living in trees, and finding their food in nuts, fruits or insects which harbor in the bark, have strong beaks and feet. The latter are provided with four toes, two of which are directed forward and two backward, and give them a solid support in clinging to and climbing up trunks of trees; these are classed in the third order, and are called *Scansoriæ* or *Climbers*. Birds that find their food in grains, or by scratching in the earth, have a short, convex beak, and feet adapted for walking or running. Most of our poultry belong to this order, which is termed *Grallinacæ*, and comprehends several families.

The fifth order, *Grallatoriæ*, is composed of birds that have very long legs, which fit them for living in swamp regions or frequenting shallow waters, into which they wade in search of prey. Their motion is awkward, and they look as if they were mounted on stilts. They are also called waders. The sixth order comprehends birds which live mostly in the water, and have the toes united by a palmate membrane or web, with very short legs and long bills, varying in shape according to the nature of their food. The name of *Palmipedes* is given to birds belonging to this order.

The feet, as before remarked, distinguish the several orders. The *Gallinacæ* or *Runners*, which are the species best known, have the three large anterior toes united by a short membrane, the posterior toe is very small or entirely wanting; they serve for running, seiz-

ing objects, or scratching in the ground, and with little variation of structure, are found in the three first named orders, viz., *Rapaces*, *Scansoriæ* and *Gallinacæ*; differing, however, thus, that the *Rapaces* have the toes armed with sharp talons, the *Passerinæ* have the middle toe joined, by means of a membrane, to the external toe. In the *Gallinacæ*, the posterior toe is very small. The *Scansoriæ* or *Climbers*, have two toes directed forward and two backward, which latter can be thrust forward at the will of the bird. The *Grallatoriæ* have very long toes, partly palmate, and the *Palmipedes* with feet expressly made for swimming, have the intervals which separate the toes filled up by a broad membrane which envelopes them to near the nail, or in other words they are web-footed. The races of birds are thus divided :

ORDER I.—RAPACES, birds of prey.

ORDER II.—PASSEINÆ, or migratory birds.

ORDER III.—SCANSORIÆ, or climbing birds.

ORDER IV.—GALLINACÆ.

ORDER V.—GRALLATORIÆ, or waders.

ORDER VI.—PALMIPÈDES, or swimmers.

## FIRST ORDER.

### BIRDS OF PREY.

#### RAPACES OR ACCIPITRES.

These birds are easily recognized by their sharp and crooked beaks, and strong claws, by which they are enabled to seize and tear their prey. They mostly inhabit large forests and mountains; they are almost

always on the wing, and their flight is entirely noiseless, but, when descending upon a prey, incredibly swift. Their sight is so extended and clear that they can discern the smallest booty when they themselves are so high as to be beyond man's vision. They are very voracious, and eat to repletion; after feeding they generally rest for a time, and disgorge the bones, hair, or feathers. They are divided into two families, *Day Birds of Prey*, or *Diurnæ*, and *Nocturnæ*. The first are distinguished by a membrane, called *cera*, which covers the base of the beak, and eyes directed from the side; the latter by the eyes being directed forwards and protruding, and likewise by the external toe possessing the capability of being directed either forwards or backwards.

## FIRST FAMILY.

### DIURNÆ.

These are divided into two families, *Vultures* and *Falcons*.

The beak of the vulture is at first elongated and curved only at the end; the head and neck are partly naked; their wings are so long that when they walk they keep them half extended, and their feet are armed with claws, which, in proportion to their size, are not very sharp. They feed mostly on putrid carcasses, and seemingly shrink from all living beings.

The most remarkable is the *Red* or *White Headed Vulture* (*vultur fulvus*), plate 14, fig. 1. This bird is of slender form, about three and a half feet in length, in color of a reddish brown, wings and tail black, neck and under surface of the body white, and in breadth of wing



measures eight feet. It inhabits Greece, Italy, Egypt, and sometimes wanders into Germany; the vulture may be tamed, but is then lazy and dull, remaining for the whole day in one place, without moving, except occasionally to dress his feathers, at which time he flaps his wings. His eyes have an expression of gentle indifference, and he is so timid as to be terrified at the movement of every living thing. He is fond of fresh meat, and loves to bathe in clean water.

The *Gray Vulture* (*vultur cinereus*) equals the foregoing in size, is of a dark brown color; the neck is naked, and of a grayish blue; it inhabits the same region as the *vultur fulvus*, and in habits only differs in that it eats carrion as readily as good flesh, and seizes on living animals for prey. A very costly species of peltry is manufactured from the skin, which is covered with beautiful down.

The *Black Headed Urubu* (*vultur jota*), resembling a turkey-cock in shape and size, is about two feet long, and black. The head and neck are dark gray, the ruff brownish white, the beak slender, and of a reddish color, with very small nostrils, and whitish feathers on the legs. It is found all over South America, and is considered of great utility, as it performs a most important office in the economy of Nature, by the removing of dead and putrefying flesh. It is a sociable bird, and loves to congregate in numbers of twenty and thirty, in trees and roofs. It is not molested, as it is very peaceable. It becomes very tame, and builds its nest in trees or fissures of rocks, where it lays two white eggs.

The *King of the Vultures* (*vultur papa*) is about the size of a goose; in the first two years its hue is a brownish gray, in the third, it assumes its adult coloring, which

is black and fawn color; the head and neck are of a handsome red, as is also the cere and the wattles; the caruncle and feet are of the same color. This beautiful bird inhabits South America, and is very useful in removing all sorts of putrefying substances from its neighborhood. Its food is carrion, snakes, lizards, or putrid fish. It is called *King of the Vultures*, from the popular belief that no others of the species ever disturb it when feeding. Its flight is uncommonly graceful, and in disposition it is shy and timid.

The *Condor* (vultur gryphus) is the largest of all birds except the ostrich and cassowary; about four feet high, and in expanse of wing fourteen feet. The body is covered with a shining black plumage; the ruff is whitish, head, neck, comb, and wattles red. A great many stories have long been current respecting this bird, which seem to have their origin only in that love of the fabulous natural to men. The condor is a native of South America; living among the Andes, he wheels his flight higher than Chimborazo; his usual range, however, is three thousand feet. Here, in the regions of perpetual snow, and beyond the reach of man, they make their eyry, where three or four of these birds may be seen grouped together. It is said that the female builds no regular nest, but deposits her eggs, which are white, and about the size of those of a goose, on the naked rock. Unlike other vultures, the condor does not feed on carrion, but is a bold robber, pursuing deer, llamas, and even cattle, until they fall down exhausted by fatigue and terror. Having seized and lacerated his prey, he begins to banquet on the living carcass, feeding to such repletion that, unable to move, he is readily captured by a lasso. Finding himself in danger, the

condor disgorges a portion of his food in order to enable him to escape by flight. In captivity he is at first sad, then afterwards fierce and belligerent; but if taken while young, at last becomes so tame as to be trained to obedience by a word from a master.

The *Lamb Vulture*—*Lammergeyer*—(*vultur barbatus*), plate 14, fig. 2. The *Bearded Vulture* differs from all others of the race by having the head and neck covered with feathers, the beak longer and straighter, with a pencil of black bristles under it, from whence it derives its name. The largest of the species found in Europe is nearly four feet high, with plumage of a dark brown on the back, but that beneath the body is of a clear yellow; the head is tawny white, the eyes red, the wings measuring eight and a half feet in expanse. Its range extends to most of the principal mountain chains in Europe and the Caucasus. It makes its nest in the clefts of the most inaccessible rocks, the female depositing from three to seven brown spotted eggs, over which she broods in March. Bold and daring, these birds pounce down on chamois, kids, hares, or wild fowl, and seizing them in their powerful talons, bear them high aloft. Sometimes they attack large animals, and even man himself, but in this case they choose the brink of a precipice as the scene of their exploits, and descend upon their victim with such irresistible impulse as to hurl him headlong into the abyss below, where he banquets on his victim at will. The cry is a hoarse *phipp*. Tradition tells many tales of children having been carried off by these monsters of the rock, and no doubt the fable of Ganymede being carried off from among the shepherds by the eagle of Jupiter had its origin in some exaggerated exploit of this kind. There is, however, no doubt

but that the bearded vulture was the species to which the *Bird of Jove*, so often sung of by the ancients, belonged. If taken young it is easily tamed. Its cry is shrill and penetrating.

### TRIBE OF FALCONS.

This species forms the second and most numerous class of the *Diurnal Rapaces*, and are distinguished by their curved beaks; some have notched points, resembling teeth, on the mandibles; their plumage is changed once a year, and age induces so great a change, that the varieties are not easily recognized. The early naturalists distinguished between the falcon and eagle, giving the name to the latter as of a different race; at present they are termed *Noble* and *Ignoble* birds of prey. The female is generally a third larger than the male, and the plumage varies according to her age. The specimen given in the plate is that of an old male.

The *Common* or *Rock Eagle* (*falco fulvus*) is the best known of the tribe, and is found in the high mountains of Europe and America. Its length is about two and a half feet; the whole body is of a dark brown color; the head and neck are clothed with sharp-pointed feathers, also brown, but bordered with tawny; the beak is of a bluish hue. They build their eyries in old trees, or in places most remote from man, and abound in the lofty cliffs of Switzerland, Styria, and the Tyrol. Their vision is very acute and extensive, and they are remarkable for their strength, noble bearing, courage, and bold, daring attitude. They soar so high among the clouds as to be out of sight. If taken young, they can be tamed, and are so docile that they can be trained to

hunt. They never build but one eyry, which they never change; this, in which the female lays from three to four eggs, spotted brown, and in size resembling those of a turkey, serves them for the remainder of their lives. This eagle is very rapacious, and carries off prey with surprising force, pouncing on lambs and fawns, and sometimes birds. Its cry is a shrill note, something like *kiah*.

The *Golden Eagle* or *Imperialis* (*falco chrysætos*), is dark brown, with neck of an Isabella color, and black forehead; the quill feathers of the wing white, and the bill blue, or horn color. It inhabits the shores of the Mediterranean, is sometimes found in Germany, and is quite common in Egypt. It pursues its prey with terrible fierceness, and to it are to be attributed most of the exaggerated accounts given by the ancients of the strength, courage, and magnanimity of the golden eagle. In sitting, it does not maintain the upright posture common to eagles, but mostly keeps a horizontal, like that of a goose. It carries off all kinds of quadrupeds and birds, from which it tears enormous pieces, unheeding the cries and struggles of the victim. Its voice is a hoarse *krau, krau*.

The *Sea Eagle* (*falco ossifragus*), plate 14, fig. 7, is about the same in size as the foregoing; its hue is a dark brown, intermixed with dusky red. In age the feathers on the head are gray or rather white; the tail is also white; the bill and feet yellow. It is found on all the coasts of the northern seas and lakes, and finds subsistence in fishing or preying upon sea birds. The nest of the sea eagle is usually built in some inaccessible cliff or lofty tree, where it deposits two white eggs, spotted with red. It is rarely, however, that more

than one is hatched. Its cry is like that of the golden eagle.

The *Fisher Eagle* (*falco haliætas*), plate 14, fig. 4, differs from those above described by being in size one-third less; head and under surface of the body white; the other part of the plumage dark brown, with the cere and feet of a bluish hue. This bird is found on the margins of large rivers and the sea, and, like the *falco ossifragus*, darts forth from his unapproachable haunt in lofty trees or inaccessible crags, upon his living prey, and seizing it in his beak, carries it off without stopping a moment in his flight. Sometimes the fish is too large to be readily carried, and struggles to get free; in this case, however, the conqueror is dragged, by his victim, into the sea, and drowned. The nest is perched high up among the branches of tall trees, and serves to contain three white eggs marbled with brown. This species is also known as the osprey, and can be tamed, and taught to catch fish for its keeper.

The *Serpent Eagle* or *Secretary* (*falco serpentarius*), plate 14, fig. 8, is remarkable for its long legs—nearly as long as those of a heron—it is slender, about three feet high; its color is bluish or ashen gray, with black pinions; beak and feet are also gray. It inhabits the dry and open grounds on the Cape of Good Hope, and is also found in India, and is respected on account of its usefulness in destroying serpents and noxious reptiles. When he has discovered a serpent, he approaches the dangerous enemy very cautiously, keeping one wing extended, which he constantly agitates in order to parry the attack he is sure to meet with. One blow of this powerful wing is sufficient to strike the adversary down, then, alternately tossing him into the air and spurning



or treading on him with his feet until the reptile is completely exhausted, this singular bird kills and devours him at his leisure. These birds are suspicious and cunning, are always found in pairs, and run rather than fly. They make their nests in high trees, where they lay two or three white eggs, mottled with red. The young have an unwieldy and very awkward gait, but in the adult age their movements are majestic and graceful.

The *Common Falcon* (*falco communis*), plate 14, fig. 6, is about as large as a hen, has one triangular black spot on each cheek, is dark brown on the back; the under surface of the body is of a yellowish white, spotted with brown; feet and cere, part yellow and part blue. It is a native of Europe, as well as of northern Asia and Africa, and is a strong, courageous, and intelligent bird, flying with great swiftness, and very expert in striking down larks, partridges, ducks, or any other winged prey. It never hunts quadrupeds except from extreme necessity, and will not feed on putrid carcasses. Building its nest in rocky precipices, or high trees, it deposits its eggs, never more than four, which are of a reddish hue, spotted with brown. Taken young, these birds are remarkable for their docility, and in the early times were trained for the sport termed hawking. In order to instruct the falcon, or merlin, and render him obedient, his head was covered with a cowl or hood which prevented his seeing, he was then made to perch on a hoop that was hung from the ceiling, and this being often touched so as to swing, prevented the bird from resting. Thus, by hunger, watching, and the privation of light, he soon lost all idea of liberty, as well as his native wildness. He was considered tame when he received the food offered without biting, and was then trained by

degrees to sit upon the gloved hand of the falconer, and obey his command. These lessons having succeeded, he was taken out, and some appropriate game being in sight, the hood was thrown off his head, and he was trained to pursue and bring down the living victim, which he soon knew how to do, and accomplished the task with great avidity.

The *Tower Falcon* (*falco tinniculus*), about as large as a turtle dove, is the handsomest of the species. The plumage on the back is of a bright red color, spotted with black; the crown of the head and tail are light gray, the under surface of the body is a rusty rosecolor, with oblong spots of black; cere and feet are yellow. It is found all over Europe, makes a nest in high towers or hollow trunks of trees, and lays from four to six reddish yellow eggs, which are spotted with brown. The young are easily tamed, and remain in the neighborhood of the place where they have been reared; but in September they migrate as do the larks and other birds. His tone or cry is *kli, kli, kli*, and being often fed on the flesh of pigeons, liver, etc., he becomes not only very familiar, but likewise injurious to the small game, which he pursues on his own account. He can be trained to hunt.

The *Sparrow Hawk* (*falco nisus*), is somewhat larger than the tower falcon, brown above, white below, striped with black; but in age these are a bluish gray. It is lively and cunning, but cowardly; flies low but with great swiftness, and feeds upon small birds and mice. Its cry is *kirk, kirk, geegee*; and, as it is very docile, can be trained to hunt. The female builds in high rocks or hollow trees; four or five is the number of eggs she lays; these are of a dusky white, rough, and marked with reddish spots on the long end.

The *Kites* (*falco milvus*), are two feet in length, with forked tails like the swallows. Their plumage is of a russet color, spotted with brown, the beak bluish, the cere and feet yellow. They are by no means scarce, and, plunderers of the farm yard, are held in general aversion. The elegance of their flight has been celebrated by poets. The kite never takes any prey in his flight; an insidious thief, he waits for a suitable opportunity, and then pounces down on chickens, goslings, mice; lives mostly on accidental carnage, although sometimes, when pressed by hunger, he will eat snails, worms, or putrid carcasses. He is so cowardly that he will fly before sparrows, if, as they are sometimes trained to do, they attack him. He builds his nest in forests or hillocks, covered with thick herbage. These nests are large and flat, and at the end of April serve to receive three eggs of a whitish color, irregularly sprinkled with dusky red spots. Their cry is well known, sounding like *hi*, *hi*, *hiah*.

The *Buzzard* (*falco buteo*), is of the same size as the kite. The upper part of the body is of russet brown, the lower paler in hue, with white throat, blue beak, and yellow cere. These birds, which inhabit the temperate zone, remain throughout the year or wander only to short distances. Those of the frigid zone migrate to warmer climates. They build their nests in tall oaks or beeches, and in April lay three or four eggs of a whitish green color, spotted with brown. They feed mostly on mice, moles, grasshoppers, etc. They utter a cry something like the notes of a cat—*miah*, *miah*.

The *Honey Buzzard* (*falco apivorus*), is of the same size as the foregoing; its head is of an ashen gray, neck and back brown, irregularly waved with gray, the lower

surface of the body white, mottled with brown, and the beak and cere black. In the north they are migratory. They build their nests in large forest trees, and in May brood over two or three eggs of brownish yellow, streaked and spotted with dusky red. They are very lazy and stupid. Their food consists of insects, mice, lizards, frogs, etc. Their cry is *kik, kik, kik*.

The *Chicken* or *Gos Hawk* (*falco palumbarius*), is about twenty-one inches in length from the crown to the tail inclusive; its color is ashen gray, the tips of the wings black, the under surface of the body white, with a number of wavy lines or bars of deep gray; the beak is blue, cere and feet yellow. It is found almost everywhere in the temperate zone, and breeds in lofty trees, hatching its young in May. Its eggs, two or three in number, are of a whitish green, with gray and brown spots. It is one of the strongest, most rapacious, and cruel of the tribe of rapaces, hunting down and devouring all kinds of birds and small animals. In the early times it was trained for hawking. Its note is *gia, giack, keik, keik*.

The *Wandering Falcon* or *Pigeon Hawk* (*falco peregrinus*), is seventeen inches in length, with the greater part of the body clothed in plumage of ashy blue, in the corners of the beak one black spot; the throat is white, the breast russet, with brown waves or bars; the beak itself is blue, and the cere and feet yellow. Its home, like that of the foregoing, is in the temperate zone, mostly builds its nest in the clefts of rocks and cedar forests; its brooding time is May, when it deposits from three to four eggs of a reddish yellow color, spotted with brown and russet. It is a bold, strong, and courageous bird, and, trained to hawking, will strike down

any bird in flight. It flies with astonishing rapidity and always in an oblique direction. The buzzard and kite sometimes rob him of his prey. His usual note is *kajak*, *kajak*.

The *Lark Falcon* (*falco subbutea*), or *Red-tailed Hawk*, is thirteen inches in length, with head and neck white, the rest of the body a clear russet, blue beak, feet and cere yellow. It inhabits the warm and temperate portions of Europe and America, and is migratory. It builds its nest in May in large forest trees, where it broods over three and four eggs of a dirty white color, mottled with brownish red. Notwithstanding its small size, it is uncommonly active, swift, and resolute, pouncing upon every little bird it meets in its flight. Its principal food, however, is insects, moles, or mice. It will not touch carrion. Its flight is exceedingly rapid; its note sounds like *gath*, *gath*, and of a familiar disposition, suffers itself to be tamed, and is easily trained to hunt small birds.

The *Red-tailed Buzzard* (*falco leverianus*), Wilson, (*falco borealis*), Audubon and Nuttall. A native of every part of the Union and of Canada, performs partial migrations to the Southern States, where, indeed, it is at all times most abundant. It is from twenty to twenty-two inches in length; bill grayish black; cere, sides of the mouth, and legs yellow; upper parts dark brown; tail of male rounded and of bright brown color, that of female blackish; young, tail pale dusky brown, crossed by nine or ten blackish bands. The *Hen Hawk*, as it is called in the United States, builds its nest early in February, on some tall forest tree, yet not remote from the farm house. The eggs, four or five in number, are of a dull white color, spattered with brown or black.

The flight of this bird is firm, high, and continued ; it sails a great distance without any apparent motion of its wings, but often utters, in a prolonged, mournful cry, the sound *kæ*, with no other purpose seemingly than to warn the usual objects of his prey of their danger. Squirrels, rabbits, chickens, mice, etc., are its common food. It is very bold in its assaults upon the fowls of the farm-yard, and therefore much dreaded by the farmers. Like other birds of their kind, they are covered with vermin.

The *Harlans Buzzard* (*falco harlani*), Audubon, belongs to the south. As only two specimens have been captured, its habits are little known. These birds resembled the black hawk (*falco niger*) of Wilson, were hard to approach, and when severely wounded and captured, they proved fierce, courageous, and intractable, and died refusing food. They evince more fondness for common domestic poultry than for hares or squirrels.

*Broad-winged Buzzard* (*falco pennsylvanius*), Wilson, Bonaparte, Audubon. It is believed the broad-winged hawk is never seen far west of the Alleghany Mountains ; but in Virginia, Maryland, and the States eastward, it is by no means a rare species. Its length is fourteen inches, expanse of wings, thirty-three ; bill black and slightly toothed ; on the back dark brown ; under surface spotted and barred with white. The female is larger than the male. Its nest is placed on large branches near the stem of the tree, being composed of dry sticks and briars, and lined with the large feathers of the common fowl and other birds. Its flight is easy and graceful. It seldom pursues other birds of prey, but is frequently teased by the little sparrow hawk, the king bird, or martin. It attacks young chickens, duck-



lings, etc., and in winter feeds on insects and various small animals. It swallows its prey without much dividing, and in its stomach have been found wood-frogs, portions of small snakes, and the hair of small quadrupeds.

The *Sharp-skinned Hawk* (*falco fuscus*), Audubon, ranges far to the north and south, and is met with in every State and territory. It resembles the gos hawk in its form and habits so closely as to be called the miniature gos hawk, and therefore requires no particular description.

The *Large-footed Hawk* (*falco peregrinus*), Bonaparte, Audubon, and Nuttall, was almost unknown in the United States at the beginning of the present century, but of late years it is often seen. This hawk is believed to be identical with the common wandering or passenger falcon of Europe, well known in regal sports in former times, and still highly valued in Persia, Tartary, and China, where falconry is still practiced.

## SECOND FAMILY.

### RAPACES.—NOCTURNÆ.

The birds of prey belonging to this family have large round heads; the eyes, directed forward, have very large and protruding pupils; their sight by day is very weak, but, owing to the peculiar formation of their organs of vision, they see better in the dark. Their plumage is fine and soft, and their flight is altogether noiseless. If disturbed in daytime and forced to open their eyes to meet the sun, they exhibit symptoms of displeasure, striking with their bills, drawing up their eyelids, and making many demonstrations so ridiculous as to provoke

laughter. At such times, the little birds, having nothing to fear, fly backward and forward, chirping gayly, as if in mockery of the helpless enemy. Many of this species have external ears.

Those of the family best known are the following :

The *Uhu* (*strix bubo*), plate 14, fig. 3, the largest of the owl race, is two feet in length, of a yellowish brown color, blazed with black ; the ears are large, and feet covered with feathers quite to the toes. It is found all over the world ; ordinarily inhabits forests, or establishes its retreat in caverns or clefts of rocks, or in the ruins of old castles, where it lives solitary and alone, its presence betrayed only by its fearful screeching of *uhu, uhu*. Strong and courageous, the owl was in former times employed in falconry to attract the kite and lesser birds ; and in some places is still used in hunting small game ; great care, however, is necessary in this sport, for, however tame and tractable he may seem, he often inflicts severe wounds with his claws. It feeds on birds, mice, and all small animals of the rodentia order, and is very injurious in forests where game is preserved. Its nest is very irregularly constructed ; a few sticks piled together and lined with dry leaves serve as a receptacle for three or four white eggs, much like those of a hen.

The *Horned* or *Great Eared Owl* (*strix otus*) is fourteen inches in length from the crown of the head to the tail ; they have movable tufts of feathers half the extent of the head, from whence the name *horned* is taken ; the external ear is very large. The upper surface of the body is of russet yellow, varied with dark brown and gray lines ; the under portion is rather lighter, with waves of black. Birds of passage, they are found everywhere, and generally deposit their eggs

(white, and four in number) in some old crow's nest, forsaken by its owner. They prey upon all the small mammalia, birds, amphibia, and insects. Their nocturnal solos are not unmelodious, the note sounding like *rumb, rumb*.

*Snowy Owl* (*strix nyctea*), Linn. Length of female twenty-six inches, extent of wings fifty-four inches; iris bright yellow, claws black; body white, more or less spotted and barred with dusky brown; tail rounded; feet thickly clothed with long feathers. The snowy owl is merely a visitor to the United States, from more northern regions. It is frequently met with in Pennsylvania. It is very voracious, and has been known to swallow a rabbit whole, and catches fish and clams in shallow waters. It may be taken in traps baited with muskrats.

*Barred Owl* (*strix nebulosa*), Wilson and Audubon. Length of female twenty-two inches; male smaller; grayish brown, with transverse whitish spots; beneath whitish; neck and breast with transverse bars; tail also barred; legs clothed with short feathers; extremity of toes covered with scales. Found on both sides of the Atlantic. When domesticated, they prove admirable mousers, but unfortunately can not be restricted to the destruction of mice in the exercise of their natural propensity. The barred owl abounds in Louisiana.

*Large Horned Owl* (*strix virginiana*), Bonaparte, Audubon. A very large species. Also called the *Cat Owl*. Male twenty inches long; bill black; iris bright yellow; horns broad, three inches long, formed of twelve or fourteen feathers, with black webs, and edged with brownish yellow. Female twenty-four inches long. Found everywhere, from Hudson's Bay to Florida. It

has been called the *Eagle of the Night*, and the *Nimrod of the feathered tribes*, because of its courage and prowess. Next to the snowy owl it is the largest of its genus. It feeds on all kinds of poultry, hares, opossums, squirrels or mice, and when chance throws a dead fish on the shore, it feeds on it with avidity. Its cry sounds sometimes like the barking of a dog, at others resembles the stifled groans or cries of a man in distress.\*

The *Dwarf Owl* (strix scops) is one of the smallest of the genera nocturna. It is also called the *Little Horned Owl*, having the head furnished with tufts. It is eight inches in length; is found in Italy, Africa, and Asia, and sometimes, but rarely, in South Germany. It is migratory; returning very early in the spring, it builds its nest in a hollow tree or clefted rock, where it broods over from three to five white eggs. On the beautiful summer evenings, and before the nightingale has begun her song, the melancholy wailing notes of this owl may be heard, sometimes sounding like *kiu*, but more frequently resembling the ominous boding of *death, death*. Therefore, in Switzerland, it is generally called the death bird, or herald of death. It lives entirely on crickets, grasshoppers, and other insects. Not larger than a black bird, its color is ashen gray, mixed with white and russet and striped with black. It is supposed to be the *Parra* of the ancients.†

The *Common Gray*, or *Screech Owl* (strix aluco), plate 14, fig. 8, is about one foot in length, has no ears, with feet feathered even to the claws; its color is a reddish gray, mixed with irregular brown stripes; the under surface of the body is white. It is found in every

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\* American Birds.—*Tr.*

† Horace, Ode III., 27.

forest, and, fond of heat, will fly towards a fire. Too lazy to build a nest, it deposits its eggs in the hollow of a tree, cleft of a rock, or the nests of other birds. Its voice is most dismal, sounding like the hootings of a drunken man, or screechings of an angry cat.

The *White*, or *Barn Owl* (*strix noctua*) is as large as a pigeon, and gray, spotted with white; is more common in Europe than in the United States. This may be owing to the want of ruined towers, castles, and monasteries, which, never found in the New World, afford these birds such safe retreat in the Old. These are their chosen haunts, and within their dark recesses they can brood unmolested over their eggs, of which they generally lay three or four. This owl is attracted by fire, and often flies around the windows of a sick chamber, within which a light is kept burning, and by the superstitious is considered a sure foreboder of death. Their cry, dismal and plaintive, is interpreted *come away, come away*, and fills the heart of the listener with dread. Their food consists of small birds and insects.

The *Veiled* or *Hooded Owl* (*strix flammea*), is one of the handsomest of the owl race. Its length is one foot; its color is russet, watered with white, and has a large disk of white fringed feathers around and over the eyes, whence it derives its name. It inhabits Italy and South Germany, makes its nest in clefts of rocks or towers of churches, and usually lays five white eggs. It feeds on mice, bats, birds, etc., and is the *Strix* of the ancients. Many fabulous tales used to be related of this bird, which was believed to possess the power of enchanting children. Its voice is a hoarse *churuh*.

## SECOND ORDER.

## PASSERINÆ.

The characteristics of this order are more negative, since it includes all birds that are neither swimmers, waders, climbers, rapacious nor gallinaceous; but, notwithstanding, it contains a greater variety than any other, since all the birds not assigned to the other five orders belong to it. These are mostly the smaller species, which feed upon insects, fruit, and grain; very few of this class pursue other birds. The most of them have the external toe joined to the middle one by means of a membrane; the length of these toes varying, assists, together with the beak, to form a distinguishing mark in their several families.

## FIRST FAMILY.

## DENTIRASTES, OR BIRDS WITH TOOTHED BEAKS.

This family includes those *Passerinæ* that have the beak notched on both sides, near the point. Standing at the head of these are

I.—THE SHRIKES (*Lanius*),

Which have the beak conically compressed and hooked at the end. They feed on insects and small birds.

The most remarkable of the race is the *Common* or *Great Shrike*\* (*lanius excubitor*) of Wilson and Au-

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\* Also called *Ninekiller*, which name is derived from the popular belief that he catches small birds, to the number of nine, and impales



dubon; about as large as a thrush; the upper part of the body is ash-colored, the lower white, a long black stripe of stiff hairs extends from the nostrils. The birds of this genus feed on insects, snails, worms, lizards, and small birds; their song is melodious and flute-like; they lay five or seven eggs of a white or pale green color, but encircled at the larger end with spots of violet or red. Their nests, on the outside, are composed of moss interwoven with long grass; within they are usually well lined with wool. They can be tamed, and are often domesticated on account of their musical qualities. Their bird-call is *gree, gree*.

The *Gray Wurger* or *Strangler* (*lanius minor*), is about the size of the field lark, gray on the back, and red on the lower surface of the body, has, like the above-described, a stripe of stiff hairs pointing outwards; the feet are black. Small birds and insects are its food; eggs white, spotted in the middle with brown. They are very docile, and can be taught to imitate the notes of the nightingale, lark, etc., but have no song of their own. Their bird-call is *grick, grick, grick*. Taken when old, they die immediately, as they can not bear confinement.

The *Butcher Bird* (*lanius collurio*) is about six inches long; his head and neck are of a bluish ash color, back and wings rusty brown, throat white, and under surface of the body bright red. He is migratory, and generally makes his appearance in May, when he may be seen in the neighborhood of thorn hedges, which are his favorite

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them on a thorn before he begins to tear them to pieces to satisfy his hunger. A better reason is, that, being a bold bird, he hangs his prey on a thorn as a butcher does a beast on a hook, that he may sever it more conveniently.

places of resort. He feeds upon beetles, crickets, and gad-flies, which he impales upon a thorn and leaves until he has caught a sufficient number to furnish a full meal. He pursues the same course with small birds and field mice. The eggs, five or six in number, are of a greenish white, spotted with gray at the larger end; both male and female brood over the nest. The birds of this genera have no song of their own, yet they are not unmusical, and are often captured and kept for parlor birds, as, being able to imitate the notes of other songsters, they are agreeable performers. They are pretty, and remain lively in confinement, but they must be captured young, and if fed on cooked meat and biscuit they thrive well. Their bird-call is a hoarse *gek, gek, gek*.

## II.—FLY-CATCHERS.—SMALL BEAKS (*Musicapa*),

Have a rather weak and compressed beak, curved towards the point. They feed on small birds and insects, which they catch on the wing. The most remarkable of the race are

The *Spotted Fly-Catcher* (*musicapa crisola*); the upper surface of the body is of a mouse color, on the under white. It is found all over Europe; its length is six inches, and it builds its nest near the buildings of men in order to catch the flies which harbor near houses. It makes no pretensions to song; its only note is a harsh *tschrie, tschrie*. It lays five bluish white eggs, which are marbled with brown. A smaller specimen of the race is

The *Pied Fly-Catcher* (*musicapa albicollis*), plate 15, fig. 11, has its brownish-gray wings tipped with white; its neck is encircled with a white band or collar,

the under part of the body is also whitish, but the head is a dusky gray. It is an active, lively, cunning, but suspicious bird, little known among us, but plentiful in Europe, particularly in Italy.

The *King Bird* (*musicapata tyrannus*), Linn ; (*lanius tyrannus*), Wilson, Audubon, and Nuttall ; is a native of the Southern States, and although men destroy it, Mr. Audubon declares its occasional destruction of a honey-bee or the larceny of a few raspberries and figs is more than compensated by his beneficial deeds, which are the destruction of countless flies, which he catches while upon the wing. This bird, sometimes called the field martin, is eight inches long, general color above, dark ash, approaching black, head and tail nearly black. It has a crest of rough feathers on its head below the black surface of which is seen a bed of scarlet, inclining to orange. Bill broad at base and black ; legs and feet black—iris hazel. They build on the branches of trees, and form their nests with much ingenuity. The outside is composed of twigs arranged in order ; the inside is lined with cotton, wool, or horsehair. They lay from four to six eggs, and are bold and courageous, fearing no aerial enemy but the martin.

### III.—THE SILKEN TAILS.—COTINGAS or CROWN BIRDS (*Ampelis*),

Have short and slightly depressed beaks, which are broad and slightly brown. The best known in Europe is

The *Common Silk Tail* (*ampelis garrulus*), sometimes called Bohemian chatterer ; is nearly as large as the red thrush, with soft, silky plumage, and a toupet of feathers on the head. Its color is a kind of purple

azure, with a band of black over the eyes. It is a native of the extreme northern regions, only coming in its migrations to winter in the temperate zone. The silk tails live on insects and berries. They are stupid and lazy birds, and only valued for their beauty, for they have no song, their notes being limited to a monotonous squeak. They are easily tamed, and feed on vegetables, fruit, juniper berries, etc., but are gluttinous and of disagreeable habits. They can not bear heat. The flesh is esteemed a delicacy, and their bird-call sounds like *tsu*.

#### IV.—THE THRUSHES.—(*Turdus*.)

The beak of these birds is compressed and slightly curved, but not forming a hook in front. They live mostly on berries. The species best known,

The *Blackbird* (*turdus merula*), is nine and a half inches in length; the bill is one inch, and is bright yellow. The male is black, the female dark brown, with russet-hued breast, and of a lighter shade on the throat. The blackbird inhabits the whole world, and is the only species of thrush which is both stationary and migratory. It builds its nest skillfully with twigs, moss, and earth for the outside; fine grass and hair interwoven form the inside. The eggs, from four to six in number, are of a grayish green, with leather-colored spots. Their usual tone is *zizin, tack, tack*, but their song is among the most musical of the grove. It imitates the tones of other birds, and it is said to be able to repeat words, but its voice, although very agreeable at a distance, is too shrill to make it a pleasant inmate of the parlor. These birds are sometimes kept in large cages, where they are fed on bread, meat, and other family food. They are fond of

bathing ; in their wild state they feed on worms, snails, insects, and berries.

The *Singing Thrush*, or *Grive* (*turdus musicus*), is somewhat less than the blackbird, and of a deep olive brown, with a yellowish white throat ; the breast and neck are reddish yellow, with dark brown spots. It is found in all the large forests in Europe, and building in the pine bushes a nest, made of earth and moss, the female broods over from three to six eggs of a verdigris color, spotted with dark brown. The singing thrush is migratory, and fond of bathing in flocks, and on seeing water, set up a shrill cry of *sick, sick*. The song is agreeable and flute-like. Their bird-call is *tsi, tsi, dack, dack, dack*. Much resembling the above described, but larger, is

The *Missle Thrush* (*turdus viscivorus*). This bird may be heard to sing its shrill but melancholy song as early as February. In its native state of freedom it is shy, suspicious, and cautious, but very unwieldy ; it nestles more in light places than in thickets. It is often met with on the service-berry trees and in the neighborhood of the mistletoe. Its food is the same as that of the foregoing, and its note is *schrau*. It is easily tamed, and will eat anything that comes from the family table. Its flesh is much esteemed.

The *Juniper Thrush* or *Fieldfare* (*turdus pilarus*), has the head, neck, and posterior portion of the body of an ash color, the back russet, breast and throat reddish yellow ; the beak is yellow with the extreme point black. Its length is ten inches. The song of these birds is of little importance ; not so, however, their flesh, which is esteemed a great delicacy. Its usual tone is *shasha, shasha, shack*. Habits and food like those of the same

genus already described. Resembling it, but smaller, is the *Stone Thrush*, or *Summer Red Bird* (*turdus saxatilis*). The most beautiful and best songster of the thrush family, it is from seven to eight inches in length; the plumage of the male on the head, neck, and upper part of the back is a beautiful bluish gray, the under surface of the body and tail a rusty red, and the wings brownish black; those of the female are grayish brown. It is found in Italy, Hungary, Tyrol, and in the southern part of Switzerland and South Germany. It is migratory, and is better known by being sold by bird fanciers than as a native. It builds in rocks, and lays from three to five blue-green eggs. It is a shy bird, but lively and active, hopping lightly, and springing forward with a peculiar shake of its tail and wings. Its song is sweet and melodious, and the little singer is much prized as he pours forth his notes night and day with great freedom. He requires, however, much care and good food.

The *European Oriole*, or *Golden Thrush*—*Yellow Thrush* of the Germans (*oriolus galbula*), is nearly the same size as the thrush, and has a flesh-colored beak. The male is of a beautiful yellow; the wings, the tail, and a spot between the eyes and beak are black. The female at all times is of an olive color. It dwells mostly in large forests, is exceedingly shy, and only remains during the summer months. The nest of this bird is very artfully constructed in the fork of a tree, and of the shape of a purse, is suspended from the outermost twigs. In the summer it eats cherries, to which it does great damage, as it spoils more than it devours; at other times insects and berries. The female lays four or five white eggs dotted with black. Its song notes sound like



*puh, lah* ; its bird-call is *yak, yak, craik, craik*. It is not easily tamed, and never lives long in confinement.

The *Water Thrush* (*cinclus aquaticus*), is nearly the size of the redstart. Its head and neck are of a dusky red ; body, above and below, together with the wings, is grayish black ; throat and upper part of the breast white ; the lower portion of the latter dark red. The female is lighter, with less clear white. It is found in the north and middle of Europe and Asia, is a solitary bird, and never migrates. It is remarkable for its partiality to brooks and waterfalls, swimming and diving as expertly as birds that are purely aquatic, darting down into rapids in search of small animals, on which it feeds and walks about on the bottom or swims below the surface of the water without an apparent effort. A thick coat of feathers protect its body from the influence of the wet. It builds its nest in some hollow of a rock near a waterfall, and so arranges it that any hostile birds must fly through the cascade in order to reach the spot where its eggs, numbering from four to six, are deposited. Its brooding time is March. It feeds on all kinds of water insects, but when domesticated, which is easily done if taken young, it soon becomes accustomed to the same food as is given to the tame nightingale. Its song is loud, and its tones varied. Its peculiar cry is a shrill chirp, resembling *zerb, zerb*.

#### V.—THE LYRES (*Mænura*),

On account of their large size have been placed with the gallinaceous birds by naturalists ; but from the disposition of the feet and beak they approach nearer to the thrushes. Only one species is known, called the *Superb*

*Menura*, and which lives in the Blue Mountains of New Holland. This bird, about the size of a golden pheasant, is of a dark brown color, with a bright yellow throat. The male bird is remarkable for the beauty of its tail, which is composed of sixteen feathers, the inner ones of which are very fine, the outer very broad and bent, so that altogether they form the shape of a lyre.

#### VI.—SLENDER BEAKS.—WARBLERS.—(*Motacilla*.)

The first of these is

The *Nightingale* (*motacilla lusciniæ*), which is as large as a sparrow. The plumage is reddish brown above and whitish gray beneath, the tail being a little red. This bird is found all over Europe and in northern Asia, and makes its dwelling in shady groves, where it loves to build; its nest is mostly made in the bottom of thickets or garden hedges. It is migratory, seeking a warmer climate in winter, but always, if unmolested, returns to its old place, as though partial to the spot where it was hatched. Coming in the middle of April, it remains until late in August, when it goes to winter in the south. It feeds on insects, young caterpillars, butterflies, etc., and is fond of currants and alderberries. When tamed, nightingales are kept, during the summer, in a cage in the window, where they are fed on the larvæ of ants, hard-boiled eggs, seeds, etc. Fresh ants' eggs are absolutely necessary; deprived of this species of aliment, they die. Each nightingale occupies a certain district, where it builds its nest; it always chooses some low place, as the trunk of a decayed tree, or even the earth among the tall grass. The nest is very simple in its construction, and serves for the reception of from

four to six greenish-brown eggs, over which the female broods ; the young ones hop out from it before they can fly. Being inquisitive birds, they are easily captured ; a few meal worms or moth flies laid as a bait under a net is sure to entice them into it. Their bird-call is *witt, kor*. The male has a most melodious voice, and in the warm summer nights his harmony delights the listener. Bird catchers distinguish between those which sing only at night, and others during the day, but all, rich in melody, pour forth their soft and varied warblings with little intermission for nearly three months. The nightingale occupies the first rank of singing birds, and is dignified with the title of King of the Warblers.

Much resembling, and by many preferred to the above described English nightingale, is the *Sprosser*—German (motacilla philomela), which is found in eastern Europe, Hungary, Poland, and Austria, and rivals, if it does not surpass, all other birds in melody.

The *Monk* or *Black Cap* (motacilla atricapilla), is ashy brown above, whitish beneath, and the male has a dark brown spot, resembling a cap, on his head ; that of the female is rather larger and of a rust color. They are migratory, and are found everywhere in Europe, in thickets and hedges, where, like the nightingale, it builds its nest near the ground ; this is skillfully constructed, in the form of a half circle, and is composed of dried grass, moss, and wool, and lined with hair and feathers. The female lays from four to six yellowish-white eggs, which are marbled with bright yellow. In their wild state their food is the same as that of the nightingale, but as, on account of their melodious voices, they are tamed and kept as parlor birds, they are then fed on the larvæ of ants, crushed seeds, alderberries, and cooked

meat; and as they hop on hard ground with difficulty, the floors of their cages are provided with springs. Thus confined, they live as long as the nightingale, and being much more suspicious, they are not near so easily caught; but as they continue to pour out their beautiful and flute-like music throughout the whole year, they are much prized. One of their notes is a harsh *tack, rar*.

The *Common Gray Linnet* (*motacilla sylvia*), is of a grayish brown, changing into dull red, the under part of the body white, and is about the size of a nightingale. The female is smaller, and her throat is not so snow-white as that of the male. The Germans call it Grassmücke, from its habit of creeping in the grass under thickets or hedges. It is found all over Europe in copses or low bushes, but is migratory. Its food is like that of the above mentioned, but it is very partial to figs and grapes. Being very tender, these birds require great care, and if caged, must be fed like the nightingales. They build their nests in the grass, or among roots by the side of brooks, and lay from four to six white eggs, finely spotted with olive green. They are active and lively, and pour forth their melodious songs until at a late hour in the night. Their usual note is *tack, tack, tack*, and sounds like the striking of two chalk stones together.

The *Redstart*\* (*motacilla phoenicurus*) is brown above; the throat black, upper part of the back ashen gray, the lower rust color; breast and under surface dusky red, but in the female the throat is white. It is migratory, but in the summer it may be found in every copse and garden, where it feeds on insects, worms, and berries.

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\* Or Garden Wagtail.

Kept in a cage, it requires the same treatment as the nightingale. The nest is built in holes in trees or old walls, where it lays from five to seven eggs of an apple-green color. It is a pretty bird, very quick and graceful in its movements. Its song is pleasant and harmonious, and is often varied by its imitating the notes of other birds. The note by which it calls its mate sounds like *huid, de, dee*.

The *Domestic Redstart* (*motacilla tithys*) has the back and head ashen gray, throat and under surface of the body black; wings marked with white, and tail a rusty red; the female is uniformly of a sooty brown. Although its natural home is in the mountains, it seeks the neighborhood of man, and is frequently found in towers, old walls, or ruined castles, where it builds its nest in crevices, or, in its native forest, in hollow trees. It is by no means a skillful builder, but lays five pretty little white eggs, and is migratory. It is a nimble, active, and cunning bird, but can not live long in confinement. His song is less musical than that of the above described, but in other respects, such as relate to food and habits, he is the same.

The *Redbreast* (*motacilla rubecola*), is a well known little bird, with head and upper surface of the body brown, tinged with olive, the lower surface is white, the neck and breast red; that of the female is paler. It is partly migratory, remaining late, and sometimes staying all winter, in which season it seeks the warmest and most sheltered places in hedges or bushes, and not seldom the habitations of man. Very sociable and familiar, it is sometimes permitted to fly through the house at large, at others it is confined in a cage. Two can not, however, dwell within the same prison, as they fight and kill

each other. Their food and habits are like those of the species already described. The slovenly constructed nest is placed among the roots of trees or cleft of low rocks, where the female lays from four to seven eggs, which are of a yellow white, spotted with orange. Robin Redbreast is very companionable, becoming so tame as to eat out of one's hand; very fond of bathing, and remarkably active and lively in his movements, every spring he makes is accompanied by a bow and his loud call of *sipri*. His song is melancholy, and his voice soft and tender.

The *Blue Breast* (*motacilla succica*) is brown above; the throat blue, breast red, and the under part of the body white; the female has only two blue stripes on the throat. In habits, food, and dwellings these birds are like the rest of the *motacilla*, only more voracious. Their usual cry is *fid, fid, tack, tack*. Their song is very melodious, so much so that they are often called the *Water Nightingale*.

The *Common Braunelle* (*accentor modularis*). Head, neck, and breast slate color; back and wings dark brown; under part of the body fawn-colored, spotted with black. It is a bird of passage, and in Europe is found in forests and thickets, where it builds its pretty nest in the bushes, and in May deposits within it five green eggs. It is very lively and quick in its movements, but always lives alone. Insects form the principal part of its food; it is, however, very partial to seeds, particularly those of the poppy; therefore, it is easily kept in a cage. Its song is not particularly harmonious; however it is by no means disagreeable. Its usual cry is *sri, sri*.

The *Wren* (*motacilla troglodytes*) is only three and a half inches in length, of which the tail forms nearly the



half. Its color is brown, with transverse bars of black, and the throat white. The female is smaller, and more of a reddish brown; this species is found all over Europe, is not migratory, but passes the whole year in one place. Its food is the same as that of others of the same class. It is sometimes kept in a cage, which must be of close bars; nor can it be suffered to fly through the house, as it will escape through the smallest opening. It makes a large close nest in openings in hillocks or hollows in stumps, leaving only one small aperture through which it can slip in and out, where from six to eight neat little white eggs, dotted with red, may be found. The wren is very agile, and constantly in motion, and its changeful but pleasant song is to be heard throughout the year. It soon dies if confined. It has in winter a shrill chirp of *zrrr*.

The *White* or *Water Wagtail* (*motacilla alba*) is a well known bird; ashen gray above, white below; back part of the head, throat, and breast black. The female sometimes is found without the black spot on the head, and at others has it but of half the size. These birds are frequently seen in the neighborhood of houses, but are always to be met with in fields where there are holes, and stone heaps. They are birds of passage—come early in March, and leave in August, with the swallow. They feed on insects, preferring gnats and flies. They can be domesticated, and either be kept in a cage, or suffered to fly about the house; but they are filthy in their habits, and not desirable inmates. They construct their nests very simply, placing them between stones or holes in the branches of low trees. The wagtails are active and graceful little creatures, and have derived their name from the incessant motion they keep up with their long

tails. Their song is not loud, but their notes are varied, and can be heard at all times. Their bird-call is *ziwit*, *zissis*. There is another of the species called the *Yellow Wagtail*, which differs only from the above by having a yellow throat and breast.

The *Black-throat* or *Stonechat* (*motacilla rubicola*) is brown, with a red breast, black throat, and on each side of the neck and shoulders white. It inhabits the same regions as the wren, and is a restless little creature, flying constantly from bush to bush. It builds its nest in the grass, and lays five greenish-white eggs, marked with yellowish brown. Its song is nearly like that of the linnet; its bird-call is *wid*, *wid*, *teck*, *teckteck*.

The *Golden Wren* or *Kinglet* (*motacilla regulus*), still smaller than the wren, is the smallest of European birds. The upper part of the body is olive, the lower pale yellow; on the head of the male is a spot of bright yellow, bordered with black, the feathers of which stand up and form a tuft. It is found all over the Old World, especially in pine forests, where it remains all winter. Insects and their eggs serve it for food. Kept in confinement these birds thrive better in companies than alone, and can be accustomed gradually to feed on grain, but require insects at intervals. They build their small circular nests very skillfully on the outmost twigs of the firs, and lay nine eggs about as large as peas, and of a flesh color. The wren becomes so tame that it will eat from the hand, but it does not soon get accustomed to live in the house; nevertheless, when it once becomes domesticated, it stays a long time, and is useful in catching flies. Its voice is feeble but melodious; the usual cry sounds like *zitt*, *zitt*.

VII.—COCKS OF THE ROCK (*Pipra*),

Are distinguished by having a somewhat long, compressed beak which is notched; short legs and tail, with a tuft on the head; all the external toes are united about one-third from their base. The most conspicuous of the family is

The *Common Cock of the Rock* (*pipra rupicola*) is something larger than a turtle dove; of an orange color, with brown and white feathers in the tail; bill and feet are yellow, and it has a crest on its head like the hoopæ. This beautiful bird is found in the rocky regions of South America, and is sought after on account of its brilliant plumage. It lives on wild fruits and grain, and builds its nest very simply; the female lays only two white round eggs. The males are very belligerent, and fight fiercely with each other. Taken young, they are easily tamed.

## SECOND FAMILY.

## FISSEROSTES, OR SHORT BEAKS.

This less numerous family is distinguished by their beak, which is short, flat, slightly hooked, and without the notches which serve for teeth; is also so deeply cleft that the mouth appears disproportionably large. They are migratory, and feed altogether on insects. The family is divided into two tribes, the *Diurnal*, in which division the *Swallow* is found, and the *Nocturnal*, to which the *Goatsucker* belongs.

I.—THE GENUS OF SWALLOWS (*Hirundo*),

Are all remarkable for their very short feet and long wings, and on this account surpass all the other *Passerinæ* in the swiftness and endurance of their flight. The first and best known is

The *Common Martin* or *Tower Swallow* (*hirundo apus*); from seven to eight inches long; black, with white throat; toes all in front. This swallow abounds in Germany, and all other countries lying within the temperate zone, and dwells in great numbers in old castles, towers, or stone quarries. They cling to walls or rocks by their sharp claws, but their small feet prevents their moving on the earth with ease. They quarrel with other birds, and join together in numbers to attack or drive off an enemy, and sometimes contend so obstinately with each other that the combatants fall to the ground and are captured. They seldom build nests, but live in holes in walls; are migratory, and come about the last of April, but leave early in August.

The *Cliff Swallow* (*hirundo melba*), plate 15, fig. 15, is ten inches long, and the largest of the race; brownish gray above, white below, with a band of brown on the breast. It is a native of southern Europe and Africa.

The *City* or *Window Swallow* (*hirundo urbica*) is five inches in length; of a blue-black color above, white below, and also on the throat, tail, and points of wings. They come at the same time as the common martin, and build their nests of mud and straw in the angles of windows, or under the eaves of houses. The male and female brood alternately over the eggs, and keep up a continual twitter; they do not sing, but utter a low *gürr*. These

birds are held in a kind of superstitious veneration, and it is believed that the house from which a swallow's nest is once removed, will certainly be destroyed by fire.

The *Chimney Swallow* (*hirundo rustica*) is about six inches long; very black above, white below; forehead and throat brown, and the rest of the bird white. It constructs a nest in the same manner as the above, which it commonly places on chimneys or in barns or garrets of houses, against the rafters. This species pursues insects, of which they devour numbers in the sweeping course of their flight; but in cloudy or rainy weather, when such prey is not abroad, they feed on water larvæ; therefore their flying low is considered a sure prognostic of rain. The usual cry sounds like *trip, trip, tree*. The female lays six eggs, which are white, spotted with brown, and both parent birds show the most affectionate solicitude for their young brood until they are able to fly.

The *Sea Swallow*—*Salangane* of the Philippines, or *Lawit* of Java (*hirundo esculenta*), is smaller than a wren, and has a white tail. It inhabits the East Indian Archipelago, Japan, and China, and is celebrated on account of its nest, which is used as an article of food. The substance of this nest, which in shape resembles an oblong sphere cut in half lengthwise, is a whitish gelatinous mass, which easily dissolves in boiling water, and is said to make an excellent soup or dish, both palatable and wholesome. As this bird builds its nest (also called *Tunkernest*) in the most inaccessible places on high cliffs and hollow rocks, it is not clearly ascertained what material is employed in its construction; the most probable supposition is, however, that as it is a gelatinous substance, it is prepared from the spawn of fishes, organ-

ized by some peculiar operation of the stomach of the bird. The Chinese consider it a great delicacy, and it commands an extravagant price, the finer sorts selling in the markets for twice their weight in silver. It tastes like isinglass, and is said to be very nourishing; mixed with suitable vegetables it makes excellent soup. After the nests have been secured, they are dried in the shade, and afterwards assorted into three classes, the first of which always brings from five to twenty dollars a pound, the others proportionate prices. It is well known that the edible nest is a whimsical culinary fancy of the Chinese alone.\*

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\* The *Sea Swallow* or *Lawit* frequents mostly the deep, surf-beaten caves of the southern coast of Java. These caves open at the base of a perpendicular face of rock, often five hundred feet high, the mouths being from eighteen to one hundred and twenty feet in breadth, and thirty feet in height; within they continue to expand, until they attain the enormous dimensions of from one hundred to one hundred and twenty feet in width, and four hundred and fifty feet in height; and for many hundred feet within the waves of the Indian Ocean break with terrific fury. The collectors of the nests, like the Orkney gatherers of eider duck down, are lowered over fearful chasms, and move along a slippery foothold at the risk of instant destruction. The collections take place in April, August, and December. The day previous to the descent into the caves, a *bimbang* or feast is given; *waygangs*, or games in masks are performed, and there is much feasting going forward. A pretty young Javanese girl is dressed to personify Nyai Ratu Kidul (the lady queen of the South), an imaginary personage, whose permission is necessary to be given before the collectors—though trained from infancy to the dangerous pursuit—can enter the caves. The whole product of Java and Netherland India, in 1850, on account of the government, of which it is a monopoly, was  $268\frac{84}{100}$  piculs, or 35,734 pounds, worth 250,000 dollars. The Chinese attribute to it peculiar strengthening qualities, and use it in the preparation of their most refined soups.—AMERICAN ENCY.—*Tr.*



II.—THE GOATSUCKER (*Caprimulgus*),

Has a remarkably small bill, but wide gape, large eyes, long wings, and feathered feet. Its plumage is very light and silky, so that, like all of the nocturnæ, its flight is noiseless. These birds hide themselves by day in dark thickets or holes in rocks, coming forth only in the dusk of evening after prey. The best known of this family is

The *Common Goatsucker* (*caprimulgus europæus*), plate 15, fig. 13, which is as large as a thrush, is ash-color diversified with dark brown bars and white stripes. The tail is not forked. These birds live isolated, are found in Europe and Asia, one species in Africa, and several in the warm parts of America. The latter are said to be as large as owls. They are birds of passage, coming in April and departing in September. The pine forests are the places most preferred by them; there they sit during the day, blinking and half asleep, as they nestle on the earth, suffering every disturbance without resistance, or resenting an attempt on their lives. In the evening, however, they are brisk enough, and sally forth in search of phalanæ and nocturnal insects. As they are found frequenting the fields and stables where goats and cows are kept, they have been accused of sucking the milk of these animals. If pursued, they utter a hoarse cry of *dack*, and when captured strike with their wings like the owl. Their common cry is, however, *cu-r-r*, *or-r-r*. The eggs, mostly two in number, are of a dirty white, mottled with brown; these are deposited on the bare ground between some brambles, and brooded over by both the parent birds. Many varie-

ties of this family are found in South America, which, it is said, are as large as owls.

The *Chuckwill's Widow* (*caprimulgus caroliniensis*) appears in the southern parts of the United States in the middle of March. The head and back are dark brown, minutely mottled with yellowish red, and longitudinally streaked with black.

The *Whip-poor-will* (*caprimulgus vociferous*) is heard during the spring and early autumn in the middle section of the United States. Its general color is a brownish gray, streaked and finely sprinkled with blackish brown. About the middle of May the female lays two eggs. Like all birds of this genus, she builds no nest, but deposits her eggs on the ground, in some dry and sequestered situation. The Indians call this bird *Mucka-wiss*.

### THIRD FAMILY.

#### CONIROSTRES.

All the birds of this family have strong beaks, more or less conical, and without a notch; and according to its strength or thickness, do they live or not exclusively on grain.

#### I.—THE LARKS (*Alauda*),

Have the claw of the posterior toe longer than that of the others. They live on grain and insects, and build their nests on the ground. The most conspicuous is

The *Field Lark* (*alauda arvensis*), with which every one is acquainted, is, including the tail, seven inches

long, marbled brown above, whitish below, but is spotted all over with dark brown. It is found everywhere in the old world, visiting Europe in the beginning of February, and leaving in October. Fields and meadows are its favorite places of resort. It feeds on insects and small seeds, and is particularly partial to the germ of oats. These birds are often tamed; sometimes they are kept in cages and sometimes permitted to fly about the house at pleasure. In this state they are fed on hemp-seed, poppies, bread, lean meat, and sometimes salad. They build their nests on the ground, using dry grass and hair, but manifest no skill in the construction; the female lays from three to five eggs of a whitish gray, dotted with pale brown. They are selfish birds, and every pair monopolizes a certain district, into which they will not suffer any other bird to enter as a neighbor. Their melodious songs are heard either as they soar aloft or sitting on the ground. In captivity they imitate the notes of the bullfinch and nightingale. Their tones are lively and sweet, trilling and warbling mingled with shrill pipings; their varied melodies make them desirable parlor birds. Their bird-call is *gere, gere*. They are also prized on account of their delicate flesh, and in autumn are taken in great numbers in nets set for that purpose.

The *Wood Lark* (*alauda arborica*) nearly resembles the field lark in size and plumage, but is a little smaller, and has the power of erecting the feathers on its head, so as to form a crest. It inhabits countries more northern than the field lark, and is never found in such numbers. Its food is the same; it will live longer 'n imprisonment, and it is not uncommon for this species of lark to endure captivity twelve years. It is easily tamed and

not quarrelsome, but, on the contrary, confiding and lively. Its song is heard, either as he soars upward or from the high trees, as he climbs, rather than hops, from branch to branch. The female builds her nest like that of the sky lark, and lays from four to five white eggs, clouded with reddish gray. Their notes are varied and musical, and sound sweetly at night. Their bird-call is *dirli, ditloi*, and they are so peaceable that they are never seen to quarrel with other birds.

The *Tufted Lark* (*alauda cristata*) has its head, neck, back, wings, and tail of brown gray; throat white; breast of a reddish dun color, with dark spots; the under surface of the body is of a dull white, and the head is adorned with a handsome coronal of feathers. It is only partly a bird of passage, and frequently dwells throughout the year in the neighborhood of towns and villages, more, however, in the south of Europe than in the north. It builds its nest between clods of earth or on low-thatched roofs, and lays five eggs, which are of a reddish white, dotted with gray and yellow. It is a quiet and confiding bird, nevertheless it will quarrel with others of its own kind. Stout and hardy, it bears the rigors of winter well, and if kept in the house, is contented to be fed on a few small seeds. Its song is soft and melodious as that of the sky lark. Its bird-call is *dee, dee, deedria*.

The *Calendar Lark* (*alauda calendra*). The upper surface of the body is light brown, with spots of darker shade and black; throat white; on each side of the neck is a black spot; the breast and under portion of the body are fawn color, the former spotted with black. Its length is eight inches. It is a permanent resident in countries bordering on or to the south of the Mediterranean and in

Tartary; it is sometimes met with in South Germany and Switzerland. The nest is built on the ground, and contains five eggs of a dull white, spotted with brown and gray. The habits and food of this species are the same as described above. The song is very pleasant, as the expert singer aims at imitating the tones of other birds.

## II.—THE TITMICE.—(*Parus*.)

The genus *Parus* has the bill short, thin, conically compressed, straight, and nostrils concealed by small feathers. They are extremely lively little birds; they are constantly fluttering about, either plucking the grain on which they feed, or catching insects, and even small birds. The best known of the race is

The *Common Titmouse* (*parus major*), which is of an olive green on the back; yellow below; the head black, with a long stripe of black on the breast, and on each cheek a three-cornered white spot. This tom-tit is at home every where in the old world, but especially where gardens are found in the neighborhood of forests, and roams from one district to another. They climb trees like the woodpecker, in order to pick insects out of the bark. These, together with their eggs, seeds, and berries, form their principal food. When domesticated they will eat almost every thing given them, and the better they are fed the better do they sing. Cruel and rapacious, they do not spare small birds, and are often seen pursuing the larger, which they kill by striking on their skulls repeated blows of the beak. They then devour the brain, which having accomplished, the next act is to sally forth after a new victim. They build in hollow trees. The

nest is very simply constructed, and contains from eight to ten white eggs, spotted and striped with red. They are often taken in mouse-traps. Their beauty, liveliness, and activity, as well as varied songs, make them acceptable residents of the parlor. They imitate the notes of other birds. Their bird-call is *fink, fink*.

The *Pine Titmouse* (*parus ater*) is less than the above, and is distinguished from it by being gray instead of olive green, and white where that is yellow. It makes its home in the pine forests, and seeks companionship with the golden wren. Very provident, it collects a store of pine seeds for the winter; and even when kept in a cage, lays up its superfluous food to serve for future use. It nestles in hollow trees or forsaken mouse-holes, and lays from six to eight white eggs, dotted with light red. Lively, fearless, and never at rest, it is much prized as a parlor bird. Its song is a varied and vivacious twitter; its bird-call, *zipton*.

The *Blue Titmouse* (*parus cœrulus*) is olive green above, yellowish below, with a blue head; white cheeks, bordered with black; the forehead white, but in the female blue-gray. This pretty little bird lives in the large oak and beech forests. Nevertheless it is often kept a cheerful prisoner in parlors, where it is treated as the titmouse. It is quite as quarrelsome and cruel as the last described, but has not the same strength to conquer other birds. Hollow branches, high up on the old oaks, form a suitable resting place, and serve to receive from eight to ten pale red eggs, spotted with brown. Easily tamed, it is prized more on account of its beauty than for any superior melody.

The *Swamp Titmouse* (*parus palestris*) is smaller than the foregoing, with a tail two inches long; gray on



the back; whitish below; head and throat black; that of the female is lighter. It is found in gardens and wooded places; feeds on the same aliment as others of its species; the seed of the sunflower is a favorite article of food. Lively, active, and restless, these little birds tumble about in the most amusing manner, twittering and throwing themselves in various positions, as if out of mere sport. They live in pairs and are very affectionate, feeding each other alternately. Neither so timid or curious as the other tom-tits, they are, nevertheless, crafty and sly. Their nests are built in holes in trees, and contain from ten to twelve eggs of a pale brown red, spotted with yellow. Their song is feeble but agreeable. Their usual note sounds like *dia-dia, zizi-ga*.

The *Bearded Titmouse* (*parus biarmicus*) is the same size as the common titmouse (*parus major*), and is yellow, with a lead-colored head, but more particularly distinguished by a line of black under each eye, which, ending in a point behind, resembles a moustache. This is found only in the male. The tail is very long. These birds harbor in the neighborhood of swamps and morasses, where they find shelter among the reeds and bushes. Here they bury themselves so deeply during the summer that they are seldom seen; in winter, however, they wander forth in companies. Insects, and the seeds of rushes, etc., form the chief portion of their food. They build their nests in a pendulous form, and with much skill. It resembles a purse hanging between the withered rushes, and contains five pale red eggs, variously speckled. They are prized on account of their beauty and vivacity. Their song, however, is not very pleasing. Their common cry is *zit-zit*.

The *Mountain Titmouse* (*parus pendulinus*) is about

as large as the blue titmouse; gray; wings and tail brown; on the forehead of the male, and extending behind the eyes, is a broad pillet of black. This genus is found only in the south of Europe, and is seldom seen as far north as Germany. It also harbors among reeds and rushes, where it builds its nest most skillfully, in the form of a purse or bag. It is six inches long and three wide, composed of dry grass and the filaments of plants; the entrance is narrow, like the neck of a bottle; the nest, suspended by this neck, is fastened on the reeds, and, hanging a few feet above the water, forms a safe receptacle for the eggs, which are snow white, and six in number.

### III.—THE YELLOW HAMMER.—(*Emberiza.*)

This family, also called Buntings, have a short, straight, conical beak, with the under mandible protruding beyond the upper. The most noteworthy are

The *Yellow Hammer* (*emberiza citrinella*), which is greenish yellow, spotted with black; the under surface of the body, head and breast, are bright yellow; is found all over Europe and northern Asia, living in wooded places during the summer, but in winter seeking the neighborhood of barns. It feeds partly on caterpillars, but derives the principal portion of its sustenance from seeds and grain, especially oats. The nest is rudely constructed and clumsy. The eggs are of a fowl white, sprinkled with gray, and dashed with a blackish tint. These birds are seldom domesticated, their songs not being pleasant and their movements awkward. Their usual cry is a hoarse sound, like *ziss*.

The *Common Buntings* (*emberiza miliaria*) are gray

brown, with spots of a darker shade; very common in France and many parts of Germany, and, like the foregoing, assemble in flocks; their food is the same. They build nests in the high grass, or under a bush, where they lay about six eggs, of a gray or lead color, spotted with dull red, dashed with black stripes. Their cry, a loud *tirr-ritz*, is so shrill and piercing that in many places they are called "stocking-weavers."

The *Garden Bunting*, or *Ortolan* (*emberiza hortulana*) is as large as a yellow hammer, olive-brown on the back, throat pale yellow, head and neck ash gray, under portion of the body reddish yellow. The birds of the *Ortolan* family are highly prized on account of their exquisite flesh, which is deemed an epicurean morsel. They abound in the south of Europe, and are sometimes met with in Germany; they usually harbor in the low bushes of copses, but more frequently in the neighborhood of millet fields. They place their nests in the low grass or among brushwood, in which, at the end of May, may be found five eggs of grayish white, dotted and lined with a darker shade, and dashed with deep brown strokes. They would be treasured as parlor birds on account of their song, which is sweet and melodious, but they are too tender to live in confinement. Their usual note is *zwit, peck, peck*.

The *Lark Bunting* (*emberiza calcarata*), plate 15, fig. 10. The plumage on the sides is spotted; throat, breast, and cheeks of the male are black; the back of the neck russet. On the posterior toe is a long spur, like that of the lark. It is a native of the arctic regions, but visits middle Europe in company with the lark (to whose companionship it is partial), in October, and returns in February or March. It makes its nest very care-

lessly in the grass, and lays five pale yellow eggs, which are spotted or clouded with brown. Its song is pleasant, resembling that of the lark and linnet. Its usual cry sounds like *stirr, trice*.\*

The *Reed Bird* (*emberiza oryzivora*), Wilson (*icterus agripernis*), Bonaparte and Audubon, is found in all the middle and southern states. In the latter it is known as the *Rice Bunting*. Upper part of head, wings, tail, and neck black; feathers frequently skirted with brownish-yellow; bill black. The song of the reed bird, familiar to all, is extremely interesting. After feeding for a while upon the ground, they fly to a tree or copse, where one first leads off in a song, and is promptly followed by thirty or forty others—they live in flocks—producing a cheering and agreeable, yet ludicrous melody, and anon ceasing with singular abruptness. The frail nest is placed on the ground with little apparent care as to situation, but always among the grass or in a field of barley. It is comparatively large, and composed externally of coarse, dried grass and leaves, and internally lined with fine meadow grass and feathers. The eggs are from four to six in number, white, strongly tinged with dull blue, and irregularly spotted with black. Their food is the seeds of wild grapes and reeds, but, in the south, they destroy great quantities of rice. They are much sought by gunners, and are killed in countless numbers.

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\* There are various others of the bunting genus, natives of the United States, viz., the Bobolink or Rice Bunting, Rue, the Cow Bunting, the Ground Robin, the Nonpareil, the Black Throat, and Bay-Winged Bunting, with several others, peculiar to the south.—*Tr.*

IV.—THE FINCHES.—(*Fringilla*.)

The *Common Sparrow* (*fringilla domestica*) is brown above, spotted with black, gray below, with a band of white on its wings; the male has generally a black throat, but in many it is found yellow or white. It is found in all parts of the eastern continent, and does not migrate, and is very destructive to gardens on account of its voracity; nevertheless it is beneficial, rather than injurious, as it wages a perpetual war against caterpillars and winged insects. These birds ordinarily build their unshapely nests under eaves or in hollows of trees or walls, using every kind of material, so that they look like clods; these mostly contain three eggs of a foul white, with gray lines and dots, besides brownish spots. They do not sing, but have a shrill, unpleasant chirp of *deep, deep*. They can be tamed, but seldom are, as they are not pleasant inmates, spoiling the music of other birds, and, when they can, stealing their food.

The *Field Sparrow* (*fringilla montana*) is a handsomer bird than the foregoing; has two white stripes on its wings, a brown-red spot on the head. The cheeks are white with black spots. It is not so common as the one already described; is found in Europe, Asia, and America. Its food is the same, makes its nest quite as carelessly in some hollow fruit tree; its eggs are like those of other sparrows. It has no regular song, but utters a kind of chirp, which, perhaps, atones for the want.

The *Chaffinches* (*fringilla cœlebs*) are white above, pale red below, with two white stripes on the wings; the female is gray on the breast. These birds are very common all over Europe, and abundant in Germany. In

summer they keep about the fields ; in winter, however, they hover around barns, wandering from one district to another. They live on insects and grain, are easily tamed, and either kept in cages or suffered to fly. In captivity they are fed on rape or hempseed, but at times they must have something green, and do not despise an offered worm. They build a beautiful nest, bullet-shaped and open at the top, as smooth and round as if it had been turned, and is fastened with cobwebs and hair to the branch ; the outside is composed of moss and fine twigs skillfully interwoven, and inside it is lined with feathers, hair, and the down of thistles. The female lays three eggs, light blue, dotted and streaked with brown. The chaffinches are selfish birds, not suffering any others of the feathered race to dwell in their neighborhood. They are easily captured with lime-twigs ; they utter a cry which sounds like *trif, trif*, and is supposed to indicate a change of weather. They sing very melodiously, and their notes are varied. The young, if taken from the nest and domesticated, become so tame that they will receive food from the hand ; they can also be taught to imitate the nightingale. They sing from April to June.

The *Mountain Finch* (*fringilla montifringilla*) is black above, marked with fawn-colored spots ; breast is also tawny, and under the wings the feathers are of a citron yellow ; the female is always of one single color. This bird is found all over Europe, never migrating ; it is a constant dweller in forest regions, where it builds its nest on some lofty birch or pine. Very skillfully constructed, this nest contains, about the end of April, five green eggs, which are dotted and spotted with brown. Its food is the same as that of the chaffinch. Its usual



cry is *imk*. Very quarrelsome, it fights with other birds, and is more treasured on account of its gay plumage than the melody of its song.

The *Gold* or *Thistle Finch* (*fringilla carduelis*), plate 15, fig. 14, is reddish-brown above, whitish below; the fore part of the head is a beautiful red, and on each wing a bright yellow spot; the bill is flesh color, verging towards black in front. This beautiful bird inhabits Europe, frequenting the neighborhood of gardens and thickets, which it leaves in the late summer, and seeks places where thistles grow, the seeds of which, having a great fondness for, it picks out most adroitly; it never eats insects, but lives entirely on seeds. Domesticated, it is fed on poppy, hemp, and sometimes lettuce seeds. Very voracious and selfish, it drives off other birds from its neighborhood, but will sometimes feed with those of its own kind, as the linnet or canary bird. It builds its nest in the topmost branches of an apple or pear tree; and, in its skillful construction, rivals that of the chaffinch. The female, which is nearly without the red color on the head, lays six sea-green eggs, which are spotted with pale red and dark stripes. The thistle finch will pair with the canary bird; it is very beautiful, and always in motion; its rich and varied song may be heard throughout the whole year. Its usual cry is *stigitz*, whence it has received its name.\* It is astonishing how tame these little creatures become. They can be taught all kinds of tricks, such as firing off a cannon, falling down as if dead, and many other feats more wonderful than these.

The *Linnet* (*fringilla cannabina*). The back is of a tawny brown, wings and tail black and white, alternate;

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\* The German name is *Stigitz*.

the under surface whitish ; head and breast of the male of a beautiful crimson. Its place of abode is the same as that of the other finches, as is also its food. The nest is well built, and generally placed on a young pine tree or thick hedge, where the female lays six eggs of a blue-white color, and spotted, or rather freckled at the upper end with flesh color and brown. They are very shy birds ; have a pleasant, loud, and melodious song. They imitate the notes of other warblers successfully, even the nightingale.

The *Girllitz* (*fringilla serinus*) is about the size of the green finch ; top of the head, neck, wings, back and tail, olive-green, with blackish, but on the wing, white stripes ; the throat, breast and under surface of the body yellow ; the latter marked with dark bars. It inhabits the south of Europe ; never migrates farther north than the middle of Germany, where it seeks the neighborhood of low forests and villages. It builds its pretty nest on a fruit tree ; four eggs are found within it ; these are of a blue-white ground, with fine dots and strokes of crimson, which, on the large end assume the form of a cross. It is a pretty, lively little bird, that lives on small seeds, and when it is captured becomes very tame, and pours forth its musical warblings nearly throughout the year. Its usual cry is *girllitz*, whence its name.

The *Flax Finch* or *Lesser Linnet* (*fringilla linaria*) is about the same size as the above ; forehead whitish-gray ; throat brown-black ; neck, back, wings, yellowish-brown ; the head and posterior portion of the body, dark red ; and the upper part of the breast carmine-red. It dwells in the north, is a bird of passage ; its flight is very rapid, and somewhat sidewise ; very active and lively, it approaches man without fear, as if seeking companionship.

The nest is built much like that of the common linnet; small and pretty, it is placed among furze bushes or hedges, and contains four whitish-green eggs, speckled with red. The song is a soft warble, but not very musical: the usual note is *tschett, tschett, diodeedee*.

The *Siskin* (*fringilla spinus*) is the smallest, but liveliest of the linnet family. It is olive-green above, yellow below; the head, throat, tail, and wings, black; the latter relieved by two yellow stripes. It is found all over Europe as a bird of passage, and mostly in the neighborhood of alder bushes, of the fruit of which it is very fond; the seeds of pine cones, thistles, and burdocks also furnish a great part of its food. In a state of confinement, poppy and hemp seeds are necessary aliment. Although very small, it is exceedingly voracious, and requires, also, a great deal of water. It builds its nest, which is neat and pretty, among the highest branches of some tall cypress or pine tree, and lays about six gray eggs, speckled with brownish-purple. Its usual note is *dillah*; the song is only a continued twitter, somewhat shrill at the end. It soon becomes accustomed to its cage, and very tame, singing nearly all the time.

The *Canary Bird* (*fringilla canaria*) came originally from the Canary Islands, and in its native groves is of a dusky gray color, but, by being domesticated as a parlor bird, its plumage is altered and improved; those birds which are of a pale yellow, with Isabella-colored wings and head, are most admired. They breed freely with the goldfinch and linnet, and the young are very beautiful. Social and familiar, these birds are kept in wire cages, or suffered to fly about in rooms. They require much attention; must be kept warm in winter, and carefully fed, as they can not bear much cold. Rape, poppy,

and canary seed, with something green, or hard-boiled eggs, are usually given them for food. A single pair generally occupy one cage, the bottom of which must be strewn with fine sand. They are tender, and only kept as house-birds; sometimes, where there are a number together, they are permitted to fly about in a room, where pine bushes are arranged for them; they do not make their own nests, but in those artificially prepared—mostly a little basket lined with cotton—they lay their eggs, which are green, speckled and mottled with violet and brown. They add to the comfort of those nests by lining them with such articles as may be given them, as hair, etc., but often they pluck some feathers from their own bodies, which they lay round the inside, and guard their eggs most carefully, lest harm should come to them. When the young are hatched, the parents feed them with the yolk of hard-boiled eggs, or biscuit, rubbed very fine; sometimes, while yet very small, they are taken from their nest and fed by their owners; it is then necessary that the eggs or biscuit be moistened with water, and given through a quill. At the end of a fortnight they can feed themselves; in four weeks they may be taken from the old ones, but some care must be observed in furnishing them with food, as they will eat too much and die. After they are a month or six weeks old, they begin to twitter, and the bird fanciers say this is the proper time to teach them to sing. A good singer is chosen from among those who sing in their own clear and varied notes, rather than the imitators of other songsters. A canary bird, it is said, will live twenty years. They are social and gentle little creatures, and, becoming very tame, are capable of being taught a great many extraordinary and amusing tricks.

The *Yellow Canary* (*fringilla citronella*) is like the foregoing; head, breast, throat, and under portion of the body of a beautiful yellow-green, shading into gold color; back and wings are olive-green, dashed with lines of lighter shade. The female is less brilliant and smaller. These birds belong to southern climates, migrate to the south of Europe, but never further north than the middle of Germany, where they resort to the borders of forests or copses. Their neatly-built nests contain, in May, five pale green eggs, sprinkled with light and deep red spots. They are lively, active, and cautious; nevertheless, they soon become accustomed to being caged, and are peaceable and gentle. They also feed on seeds, and sing with great animation and energy. Their tones are clear, loud, and agreeable.

#### V.—PARADISEA.—(*Vidua*.)

These are African birds, which are distinguished by the beauty of the two long feathers found in the tail of the male.

The *Bird of Paradise* (*paradisca vidua*) is the size of a lark; head, chin, forepart of the neck, back, wings, and tail, black; the back part of the neck is light orange; the crown of the head, breast, and under surface of the body white; the bill lead color; the two ornamental feathers, thirteen inches in length, end in fine threads. These belong only to the male, and, it is said, he loses them in winter. The female is always dark brown. These beautiful and lively birds have been known to live in confinement twelve years. They sing, but their tones, although soft and pleasing, have something very melancholy in their sound. They require large and airy cages,

are fed on millet, canary, and poppy seed, and bring a very high price.

## VI.—THE CROSSBILLS.—(*Loxia*.)

Their strong bills are so much curved at the point as nearly to form a ball, and are also remarkable for their great size. The first of this genus is

The *Common Grosbeak*, or *Cherry Finch* (*loxia coccothaustes*), plate 15, fig. 2. Back and posterior portion of the head brown; throat and wings black; on the latter a white stripe; the rest ash gray. The bill is very large and dark blue. It dwells as a migratory bird all over Europe, frequenting the most wooded places; feeds on all kinds of seeds, berries, and kernels, and so fond of those of the cherry that it is accused of destroying the trees. Its nest is skillfully built, and contains five eggs, which are greenish-gray, speckled and striped with brown and blue. Taken young, these birds are easily tamed, and will eat almost any thing. They are, however, quarrelsome with other birds, and show great aversion to cats and dogs. Their song is not pleasant, and their usual note of *isk-isk* is shrill and by no means agreeable.

The *Green Finch* (*loxia chloris*) is green above, verging into tawny below; the outer border of the tail is fawn color. It is a native of Europe, but more particularly at home in Germany, where it frequents the wooded fields, and lives upon all kinds of seeds, eating those of the poisonous wolf's milk without injury. Confined, it feeds readily on all kinds of grain, varied at times with grasses or some green vegetables. Its nest, neatly built, and well lined with hair and moss, is placed



on the large branch of a tree, and contains five silver colored eggs, dotted with violet and cinnamon specks. Taken from the nest, the young finch can be taught (although the task is not an easy one) the notes of other birds, which they never forget, but sing the whole year round. They are very hardy. The common note is *tchick, tchick*, which, together with their natural song, is not unpleasant. They become as tame and familiar as the bullfinch.

The *Bullfinch* (*loxia pyrrhula*) is ash color above, red below, with wings and upper portion of the head black; the female is without the red breast. This beautiful bird is very common in Europe, mostly frequenting the dense forests, where it lives on berries, the seeds of pine cones, and other wild plants. It builds its nest amid the dark foliage of thickly leaved trees, or in hedges; the outside is composed of bents and moss; the inside lined with hair. The female lays six round eggs of bluish-white, which, at one end, are spotted with violet and brown. The birds of this genus are often kept in cages, where they are fed with rape and hemp seed, but they are very delicate, and die from the slightest exposure. Their natural song, consisting of but three notes, is altogether unpleasant, but they are so docile that they can be taught to imitate other birds and the airs played by a hand-organ. Gentle and confiding, they at last become so tame and familiar as to take food from the mouth of their owner.

The *Cardinal Grosbeak* (*loxia cardinalis*) is one of the most beautiful cage birds known, being, except his throat, which is black, of a carmine red, his wings amaranth, and his head is adorned with a tall tuft. This species inhabit North America, and is the most remarkable of the genus *Loxia*. They feed upon seeds of all

kinds. Their sweetly clear, but loud and melodious song, heard throughout the year, resembles those of the nightingale so closely as to cause them to be described as the "Virginia Nightingale."

The *American Pine* or *Cross-Bill* (*loxia curvirostra*), plate 15, fig. 5, is about the same size as the bullfinch, differing from it, however, in the mandibles of the beak, which are so much curved at the point that they cross each other. The plumage of the males of this genus is subject to changes of color. The young are of a greenish-yellow; the old, carmine-red; the females, gray. They inhabit the pine forests of Europe, Asia, and America, where they feed on the seeds of the hemlock and the white pine. They are very common as cage birds, when they are also fed on seeds. They build their neat nests in the cedars or pines, where may be found from three to four whitish-gray eggs, dotted on the blunt end with reddish-brown, and over which the female broods from December until April. This is a somewhat remarkable fact, for during this time the most seeds are to be found among the pine cones, and consequently good food. Their cry is *gip, gip*, and the song notes harsh and shrill. Upon the whole they are silly birds, and when kept in cages exhibit many of the habits of the parrot, using their bills to assist them in climbing along the wires. It is said that if kept in the room with a person who is sick they become sick also; therefore many believe that keeping them in a nursery will prevent disease from coming among the children.

The *Blue Grosbeak* (*loxia coerulia*)—Wilson—is a somewhat rare bird. Found in Louisiana, Alabama, Georgia, and the Carolinas, but seldom seen beyond Natchez. Length, six inches; purplish-blue; spotted

on the back ; coverts of wings edged with bay ; quills skirted with blue ; legs and feet lead color. They build their nests in secluded positions ; are very shy and difficult to catch, nor do they often sing when caged. Seeds of different kinds, rice, grass, and Guinea corn are their usual food.

*Rose Breasted Grosbeak* (*loxia rosea*), Wilson. Length, eight inches, alar extent, thirteen. Black above, except wing coverts, which are broadly tipped with white ; a spot of same on primaries ; chin, neck, upper part of breast, black ; lower part of breast, middle of under surface, and lining of wings, light carmine tint ; tail black and forked. The usual natal place of the rose breasted grosbeak is as far north as New Brunswick, Nova Scotia, and Newfoundland, but it winters south of the United States. The food of this bird consists of insects, and of the cereals and grapes. Three years are required for the perfection of its plumage. The song of the male is exceeded by that of no other American bird except the mocking-bird. It is easily subdued and domesticated, insomuch that, if set at liberty, it will return to its cage. Its song is not impaired by captivity. Great care, however, is requisite for its preservation from the effects of cold, a constant summer temperature being essential. It is migratory, and travels south about the first of September.

#### VII.—THE BEEFEATERS (*Buphaga*),

Have a tolerably large beak, which is almost square. They live altogether upon insects. Only one species is known, which is

The *Common Beefeater* (*buphaga africana*), about

the same size as the starling. On the upper part of the body is of a reddish-brown; the under, of pale tawny: wings and tail, dark brown; beak, cinnamon color. These birds are found in Senegal, and at the Cape. They have the singular habit of settling on the backs of cattle while grazing, and making use of their beaks, in compressing the skin, to squeeze out the larvæ of the *æstrus*, which they eat, the animals very willingly submitting to the operation. Their bills are very strong. All vermin are alike acceptable.

#### VIII.—THE STARLINGS (*Sternus*),

Very much resemble the thrushes, except that their beaks are more slender and depressed at the point. Only one species is known in Europe. This is

The *Common Starling* (*sternus vulgaris*), and is blackish, with yellow and white spots. The plumage of the male is changeable, varying from violet to green. About the size of a thrush, it dwells in meadows or copse woods, and, fond of society, is mostly found in company with the raven. In winter these birds fly in large flocks, roosting by night on the reeds, and making an indescribable noise by their chattering. Their principal food is snails, worms, and insects, but they will eat grain or seeds. When captured they are not confined, but, because they are so easily tamed, suffered to run about the premises. They will eat meat, bread, or whatever is given them, and, very amusing, they would be desirable companions, but they are of filthy habits, and are very curious, thrusting their bills into every place. They love water, however, and are fond of bathing. The starlings lay, in a slovenly built nest, seven eggs,

of a pale greenish ash color. Their songs are without melody, being imitations of the notes of other birds, which they mix up in the most singular manner, at one moment crowing like a cock, or humming like a spinning-wheel, and the next, imitating the tones of an organ or the voice of a man. Full of life and very active, they seem to observe all that is going on, and have been taught to speak short sentences. Their usual cry is *stoar, stoar, spett, spett*. They migrate, and in spring and fall, when they are to be seen wandering in large flocks, they are shot and considered excellent game.

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As there is no very peculiar mark of distinction between the genus of Raven and the other genera of Conirostres, except their size, we will give them a place here, and divide the family into three branches, viz., the Raven, Bird of Paradise, and Roller.

### I.—THE CROWS.—(*Corvus*.)

The beak is large, the nostrils are concealed by strong hairs or bristles; their sense of smelling is wonderfully acute, and they are proverbially fond of glittering articles.

The *Large Raven* (*corvus corax*) is nearly the size of a hen and very black; its tail is rounded and of prismatic luster; in the north, however, the raven is sometimes found entirely white. This bird finds a home everywhere in the old world, living among mountains and wild places, where it feeds on carrion, little birds, mice, and grain. Making a nest in the summit of old trees, the female lays about five eggs of a pale bluish-green color, marked with a great many obscure spots

and tints. When taken young, the raven is easily tamed, and has many qualities that render him extremely amusing. Busy, bold, inquisitive, and impudent, he marches round the house and premises as if he knew he was privileged, but with the entertaining qualities of a favorite, he shows also the vices and defects of an unprincipled hypocrite. Thievish and cruel, he seizes on young poultry or lambs, and some say children, just for the pleasure of picking out their eyes. He can be taught to speak; his voice is a harsh *krak, krak, kru, kru*.

The *Common Crow*\* (*corvus corane*), *Limaus*, in respect of size and plumage scarcely differs from the foregoing; is found as a steady inhabitant in every country, and builds its strong solid nest in the summit of forest trees. About the first of April the female lays four or five eggs very similar to those of the raven. Extremely cunning, bold, and cautious, the crow understands how to distinguish between a hunter and a traveler. Taken young, it becomes very familiar and learns to speak. Its food is the same as that of the preceding species, and if not quite as amusing, is a better domestic, as it is by no means so malicious. Its cry is *crap, crap, cru, cru*.

The *Royston Crow* (*corvus cornix*) is almost the size of the common crow; the upper surface of the body is clothed with plumage of shining black, the lower is more of an ash gray. It is a native of the north, very seldom seen as far south as Germany, and is only partially migratory. The nest, placed on trees, sometimes behind chimneys, and often on the ground, about the first of April contains four greenish-gray eggs, obscurely marked

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\* *Corvus Americanus*, according to Audubon, is the same. *Corvus coronal* of Bonaparte and Nuttall.—*Tr.*



with brown. Its habits are the same as those already described.

The *Jackdaw* (*corvus monedula*) is not larger than a dove; the body is of a beautiful hoary gray color, all the rest, wings and tail, are glossy black. It builds its nest in towers, churches, and ruined castles, is very easily tamed, and may be taught to pronounce several words. The jackdaw will eat almost any kind of food, fruit, grain, or carrion. He is a very cunning and observant bird, and attracted by glittering objects (these are always tempting baits), which he will steal whenever he can, and hide. The nest is most slovenly constructed, and contains seven green eggs, spotted with brown and black. There are, it is said, examples of their getting into dove-cots, and leaving eggs to be hatched among the doves. The flesh is eatable.

The *Chough*, or *Red-Legged Crow* (*corvus pynhocorax*) is of a brilliant purplish-black, the bill slender and of an orange color, the feet and legs of cinnamon red, and in size is similar to the jackdaw. It lives in all the mountainous regions of Europe, and is fond of building its nest in rocks seemingly inaccessible, where it broods over five pale green eggs, which are spotted with brown. These birds are gregarious, and fly around in large flocks like the starlings, and are considered by the country people sure weather prophets, flying very low before rainy weather, but if mounting higher in the heavens, fair weather may be relied on. Their food consists of insects, mice, small birds, grain, and cherries. The choughs are easily tamed, but prove rather dangerous inmates. Like all the raven tribe, they are great thieves and fond of glittering objects; they have been known to steal lighted pieces of wood from the fire, and

hiding them among the thatch or in barns, have set fire to the premises. The usual note is *crue, crue, jack, jack*.

The *Fish Crow* (*corvus ossifragus*), Wilson, Audubon, and Nuttall. The fish crow is confined almost entirely to the maritime districts of the Southern States, where it abounds at all seasons. Whole flocks may be seen on a fine morning sailing high in the air for hours. After enjoying these aerial excursions until satisfied, the whole descend near the surface of the water, and fish for half an hour, when they alight on the trees near the shore, and keep up their gabble, pluming themselves for hours. They will eat any sort of garbage, but do not scruple to rob other birds of their eggs and young, even watching the departure of the cormorant and white ibis from their nests, which they rob at the first opportunity. They pursue gulls and the smaller terns, which they compel to disgorge the small fish caught by them within sight of their oppressors. They also alight on the backs of cattle to seek for the larvæ, which are frequently generated in the skin. Berries of the holly, ilex, and tallow tree furnish variety to their food; they are also fond of pears and mulberries, and commit great havoc on fig trees.

The *European Jay* (*corvus glandarius*) is one of the most beautiful forest birds; the greater part of the body is of a faint purple or vinous gray, with black beard and tail; the wings are beautifully barred with blue; its size is the same of a dove. The jay lives in forests, is migratory and omniverous, but, like the jackdaw, easily tamed, and in a domesticated state can be fed with the refuse of the family meal; however, it thrives best on wheat or other grain. It builds a simply-arranged nest in beech or oak trees, and lays about seven eggs of a grayish ash

color, faintly spotted with brown. Its beauty of plumage, its vivacity and docility—for it can be taught many words and also to imitate the tones of a trumpet—make it a universal favorite, and it is therefore often kept as an inmate. The flesh is considered good eating. Its cry is *craw, raw, raw, miauw, miauw*.

*Blue Jay* (*corvus cristatus*), Wilson, Audubon, and Nuttall. Eleven inches in length, crest pale blue, narrow line of black along the frontlet, collar of black, forming a crescent on the breast, back and upper parts of neck light purple, bill, legs, and claws black. The blue jay or corn bird breeds in all parts of the United States except Florida, where it gives place to the Florida Jay. It is omnivorous, feeding indiscriminately on all sorts of flesh, seeds, and insects. It seldom builds a home for itself, but takes possession of some old or abandoned nest of the crow or cuckoo. It is tyrannical rather than brave, very beautiful, but mean and thievish, for it robs every nest it can find, sucks the eggs like the crow, or tears to pieces and devours the young birds. When disturbed in its depredations, it flies off to the woods and cries *kay, kay*; on reaching the covert and feeling safe, it shouts in an exulting tone *coogle, coogle, coogle*. But on returning to its own home, however, it not unfrequently finds its mate in the jaws of a snake, its eggs devoured, and its nest destroyed—a severe, but just penalty for its cruelty to others. These birds feed on nuts, fruits, and the flesh of birds, and carry off a great deal of corn, which they hide in holes of trees. They are a great annoyance to the planters.

The *Nutcracker* (*nucifraga caryocatactes*), by some naturalists considered as of a distinct genus, but by others classed with the crow, is of a rusty brown, marked

with triangular white spots, and is in manners so much like the jay, that it needs no separate description.

The *Magpie* (*corvus pica*) is of a beautiful silky black color, with purple and gold reflections. The under part of the body is white, and there is a spot of the same color on the wings; the tail, which is always in motion, is very long. It is omnivorous, and in its habits and manners resembles those of the family already described, differing only in that it is more easily tamed. It learns to utter words with great facility, but is thievish, and never fails to steal when it finds opportunity. Having a passion for silver, it carries it off and hides it, thus often making suspicion to rest upon the servants, and thereby causing much mischief. Its flight is heavy, on account of the shortness of the wings; and it builds its nest in places difficult of access, although near the habitations of men. The female lays six or seven whitish-gray eggs, mottled and dashed with black. The note is a harsh *shackerack, shackerack*.

## II.—THE ROLLER.—(*Coracias*.)

This bird is much like the crow, differing only in not having the nostrils covered with bristly feathers. The best known is

The *Common Roller* or *Almond Crow* (*coracias garrula*), plate 15, fig. 8, which is of a bluish-green on the head, neck, and breast; the back and shoulders yellowish; the inside of the wings a beautiful blue. About the size of the nutcracker, it is found in Europe and among the mountains of Northern Africa, but not in abundance anywhere. These birds are omnivorous, and build their nests in high trees; the eggs, seven in num-

ber, are of a brilliant white. If taken very young, they can be tamed so far as to know their keepers, but they always remain suspicious and quarrelsome. They are fond of feeding on frogs or the viscera of animals. Their notes are very unpleasant, resembling a harsh croak of *rack, rack, rack, rackor, rackor, rackor, krau, krau*.

### III.—BIRDS OF PARADISE.—(*Paradisea*.)

These birds have a beak like those of the crow genera, but their nostrils are covered by the velvet or down-like feathers of the front. They are indigenous to New Guinea and the neighboring islands, and the males are all provided with the most brilliant plumage, which, much esteemed as an article of dress, brings an exorbitant price. As the natives who make a trade of selling these birds, commonly cut off their feet, it used to be generally believed that they had none. They differ greatly in size, some being as small as sparrows, others as large as jays. The most remarkable of this genus,

The *Magnificent Bird of Paradise* (*paradisea superba*), plate 15, fig. 1, is black. The ornamental feathers form a kind of mantle on the shoulders; the breast is green. It is about the size of a blackbird.

The *Common Bird of Paradise* (*paradisea apoda*) is the size of a jay; the throat is of a golden green; the top of the head and back of the neck citron yellow; on the posterior part of the latter is a tuft of yellowish feathers, and beneath this springs another, larger. The two feathers which spring from the rump above the tail, are uncommonly long and fine, and when these beautiful birds are seen flying in the air, by the glancing bright-

ness of a southern sun, they bear away the palm of beauty from all others of the feathered race. The skins, dried with the plumage, are worn by many women in the east as aigrettes, and the bird itself is considered the symbol of vanity.

#### FOURTH FAMILY.

##### SMALL BILLS, OR TENUIROSTES.

Birds of this genus have slender, elongated beaks, sometimes straight, sometimes arcuate, and without teeth, or rather notches.

The first of these are

##### I.—THE NUTHATCHES.—(*Sitta*.)

They have a straight and sharply-pointed beak, which, like that of the woodpecker, serves for picking out insects, hidden in the bark of trees. Only one specimen of this genus is known in Europe, this is

The *Common European Nuthatch* (*sitta Europea*), also called the *Mason Pie*, is about the size of a titmouse; blue-gray above, reddish below; a black line runs from the mouth to the eyes. It inhabits the lofty forests during the whole year, and in winter comes fearlessly into the neighborhood of the dwellings of men. Climbing every where, it thrusts its slender bill into whatever crevice of wall or wood it can reach, in search of insects, on which it lives, and knows well how to find. It also eats nuts, acorns, hemp seed, etc., all of which it minces to pieces, and hides away, like the titmouse. It builds its nest in a hollow tree, and lays seven white eggs,



marked with small red spots. Its usual cry is *zit, zit, zit*. As a cage-bird it is only cared for on account of its unwearied activity. In the United States we have the *White Breasted Nuthatch* (*sitta carolinensis*), and the *Red Bellied Nuthatch* (*sitta canadensis*), and others, all of which closely resemble the European species.

## II.—THE CREEPERS (*Certhia*),

Have a crooked bill and slanting tail, which is furnished with stiff feathers. There is one species found in Europe, and one in the United States. The latter, *Brown Creeper* (*certhia Americana*), is by no means abundant.

The *Wall Creeper* (*certhia muraria*), plate 15, fig. 6, as large as a sparrow, is of a dark gray color; wings and tail dark brown, varied with white; the shoulders a beautiful red. It is a neat, pretty bird, but rather scarce, and is only seen occasionally, as it keeps hopping actively about, on rocks and walls, foraging for insects. This species inhabits the rocky regions of southern Europe, sometimes migrating to the north; the nest is built in the crevice of some almost inaccessible rock, and in May contains five white eggs. Its nourishment consists of all kinds of insects; the notes of its song are few, but melodious, and its usual cry of *Pfiff*, is feeble, but not without harmony.

## III.—THE COLUBRIS.—(*Trochilus*.)

The *Humming Birds* are celebrated for the beautiful colors and metallic luster of their plumage, as well as their small size. They inhabit South America and the United States; their beak is long, in some very slender

and arcuate; their tongue is long, extensible and forked. The smallest are not larger than a humming-bee, the largest something the size of a wren. These diminutive and beautiful creatures feed on the honey of flowers, about which they are seen buzzing and balancing in the air like butterflies; their long wings being in such rapid motion that the eye would be unable to follow them, were it not for the brilliant gleaming of their colors in the sunshine, where they glitter like flying gems. The nectar of flowers is, however, not their only aliment, as is generally believed; they also eat small flies and other diminutive insects, which they are very dexterous in catching with their tongues. They build their pretty little nests in the shadow of the twigs of lime or pomegranate bushes, using cotton or the down of plants in its construction; here may be found two eggs, very white, and of the size of peas. The young birds are naked; the old ones nurse them very tenderly, and defend their nests most courageously, if any one approaches it; but they are passionate and jealous, and often contend fiercely with each other. They can not be shot on account of their diminutive size, and soon die when caged. It is said that they never alight on the ground, except to drink.

There are several other species, whose habits are like those already described, all so remarkable for the beauty of their plumage, that any representation would be vain; we will only describe a few.\*

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\* Three varieties of the *Humming Bird* (trochilidæa)—a common name for a large family—are found in America. There are three sub-families, *grypinae* or *wedge-tailed*—*lamporninae* or *curved-billed*—and *trocholinae* or *straight-billed* humming birds. These beautiful and

The *Northern* or *Ruby-Throated Humming Bird* (*trochilus colubris*). Three inches long, of a golden green color above, the under surface gray; the neck ruby red; is found in the southern part of North America; is not very timid; flies with great swiftness, at the same time uttering loud cries. The changing brilliancy of their plumage, as it glances in the sunlight is no less wonderful than beautiful. The young are blind

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delicate creatures—peculiar to America as the sun-birds to the Old World—have always attracted attention, even from the aboriginal inhabitants of this continent. The ancient Mexicans worked their feathers into mantles, pictures, and various ornamental articles. No epithet has been spared to convey an idea of the richness and beauty of coloring of these birds, and yet all fail in comparison with the reality. “The lusters of the topaz, emeralds and rubies,”—“the hue of roses steeped in liquid fire,”—“locks of the star of day,”—“beams of the sun,”—and similar expressions, fall short of the changing tints of their “gorgeous plumery.” The most brilliant species live in the tropical forests, amid the rich drapery of the orchids, whose magnificent blossoms rival the beauty of the birds themselves. As we leave the tropics, their numbers decrease, and but a few species are found within the limits of the United States, some, however, reaching as high as latitude 57° north. In whatever latitude, their manners are the same; very quick and active, almost constantly on the wing, as they dart in the bright sun they display their brilliant colors, each rapid movement giving a different hue. The sub-family, *grypinae*, have the bill slightly curved, and the tail long, broad, and wedge-shaped. The genus *phaetonis* (Swains) is found in the warmer parts of South America, and is numerous in species. *Orea trochilus* (Gould) inhabits the mountains of the western side, immediately below the line of perpetual snow. *Grypus* (spix) is found in the neighborhood of Rio Janeiro. The curved bill humming birds, more than one hundred species, are not represented in the United States, unless the *manga Humming Bird* (*lampornis manga*)—Swain’s—be admitted; this may be distinguished by the absence of metallic scale-like feathers on the throat, and by the serrations of the end of the bill. It is green and gold above, velvety bluish-black below, with a tuft of white feathers under the wing. The *Ruby-Throated Humming Bird* (*tro-*

and naked at first, but at the end of a week are fully fledged.\*

The *Crested Humming Bird* (*trochilus cristatus*) is about the same size, golden-green, with a blue crest, and is a native of the Antilles. The crest can be elevated or depressed at pleasure; these birds are not timid, but will fly fearlessly around a person walking in the groves; their loud humming, heard often when their tiny selves are invisible, has oftentimes caused great alarm. It is said the ladies wear them by way of ornament in their ear-rings.†

Another branch of the family is the *Trochilus La-*

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*chilus colubris*)—Linn.—is common throughout the Eastern States, extending to Brazil. This “glittering fragment of the rainbow,” as Audubon calls it, is about three and a quarter inches in length, with an extent of wings of four and a half inches; the upper parts are green, with a ruby red gorget in the male, a white collar on the throat, and the deeply-forked tail brownish-violet. The female has not the red throat, and the tail is rounded, emarginate, and banded with black. Those wishing to study the complicated arrangement of this beautiful family, are referred to Lessons (*Historie Naturelle*) Gould's Monograph on the *Trochilidæ*; also to the Vols. XIV. and XV. of the *Naturalist's Library*.—*Tr.*

\* Most curious of all is the existence of a *Humming Bird* (*mellisuga kingii*), also found on the shores of this wintry realm—Terra del Fuego—and which, even amidst the showers of snow, has been observed flitting about in search of insects, equally hardy, that lurk in the blossoms of the veronica and fuschia.—*Ibid.*—DARWIN'S VOYAGE AROUND THE WORLD.—*Tr.*

† *Fulgian Creeper* (*oxyurus tupinieri*) is met with throughout the beech forests, high up and low down, in the most gloomy and impenetrable ravines in the inhospitable regions of Terra del Fuego. This little bird no doubt appears more numerous than it really is from its habit of following, with seeming curiosity, any person who enters these silent woods. Continually uttering its harsh twitter, it flutters from tree to tree, within a few feet of the intruder's face.—DARWIN'S VOYAGE AROUND THE WORLD, Chap. XI.—*Tr.*

*landi*, plate 15, fig. 4, also a golden green, with a crest which ends in one long feather, changeable black and blue; behind the eyes is a white spot. Breast and under surface of the body blue.

#### IV.—THE HOOPÆS (*Upupa*),

Have a handsome large crest, and are about the middle size of birds. There are only two species, one and the best known of which is

The *Common Hoopæ* (*upupa epops*), from ten to twelve inches in length; the body of a wine color; wings and tail black, and crossed with white, is found all over Europe, living in the forests and thickets, to which it migrates in spring. It is a solitary bird, and finds its principal nourishment from insects which it picks up, without much niceness, any or every where. If domesticated it must be suffered to run at large, and fed on meat, crumbs, and, from time to time, living insects. It builds its nest of grass and bents, places it in the hollow of a tree, and in May lays from four to six eggs, which are of a yellowish-gray, green, white, or chocolate brown color. Taken young it is easily tamed, and can be taught to perform many amusing tricks, such as making a bow on going out of a room, which it does by elevating its feathery crest and then depressing it, or by seeming to shrug its shoulders, a movement performed by a peculiar action of the tail and wings. The hoopæ soon learns to know its master, recognizes him wherever it may meet him, and is very attentive to all his movements. Its food consists chiefly of May bugs and muckworms, which it always first breaks up with its long bill before eating them. It manifests great dread of birds of prey, and

crouches down close to the ground when a kite or vulture comes in sight. Its cry is *rua, rua, hup, hup*. It is fond of warmth, and bears imprisonment well, being then fed on flesh cut in long shreds, seeds softened in water, the larvæ of ants, and meal worms. There is also a race of hoopœs found at the Cape, in appearance and habits resembling the above described.

## FIFTH FAMILY.

### SYNDACTYLE.

In the birds of this family the external toe is almost as long as the middle one, to which it is joined by a membrane as far as the penultimate articulation. The principal genera of this family are

The *Bee-eater* (*merops apiaster*), which have the beak long and slightly curved, are in size about the same as the blackbird. The back is light brown; the breast and lower surface of the body, a deep marine blue; the tail, blue-green; the throat, and a stripe on the shoulder, bright yellow. These beautiful birds live in the neighborhood of the Mediterranean and Black Seas. Their favorite places of resort are the shores of lakes or large rivers, where they make their nests in the precipitous banks. The bee-eater migrates as far north as Germany. Its flight is swift, and alternately high and low, like that of the swallow. Its voice is harsh, resembling that of the crow. It feeds on insects, especially bees and wasps, and is very injurious to bee-hives. It builds its nest in hollow places in the sand, and lays six or seven white eggs. Its bird-call is *sri, sri, lrii, gra, gra*. There are several species of this bird in the south.



The *Kingfishers* (*alcedo ispida*) have very short legs and long, straight, pointed beaks, and are something smaller in size than the foregoing. The upper surface of the body is a beautiful green, undulated with black, with a stripe of deep marine blue along the back; reddish beneath, with a ribbon of the same color on each side of the neck. These birds are found in middle Europe and Asia throughout the year, and delight to dwell in seeming solitude on the borders of rivers, lakes, and brooks abounding in small fish, water reptiles, or insects, upon which they feed. The nest, constructed of fine roots, is burrowed in some overhanging bank, and contains from six to seven white eggs. Many attempts have been made to domesticate these beautiful birds, but they soon die in confinement. The usual note sounds like *tiit, tit, tit*. The American species,

The *Belted Kingfisher* (*alcedo alcyon*), is crested, and inhabits all the waters from Hudson's Bay to Mexico, and is the only specimen of the tribe as yet found in the United States. Many fabulous stories are told of its manner of hatching and making nests.

The rhinoceros bird, *Calaos* or *Hornbills* (*buceros monoceros*), plate 15, fig. 12, are large birds, with black plumage, and enormous dentated beaks, which are arcuate, and surrounded by a crest or prominence often as large as the beak itself. They feed on small fish, reptiles, and insects, are very timid, fly with great swiftness, and nestle in hollow trees. The specimen exhibited in the plate belongs to the handsomest tribe. Its bill is golden yellow, and the helmet like prominence, bright red and diaphanous. The plumage is mostly black, the throat citron yellow, cinnamon colored neck, and white tail. Africa is their home, although there are many species found in India.

## THIRD ORDER.

## SCANSORIÆ, OR ZYGODACTYLÆ.

In birds of this order, termed climbers, the toes are placed two before and two behind, which arrangement gives them a more solid support and greater advantage in clinging to and climbing the trunks of trees. The climbers generally nestle in the hollows of old trees. Their powers of flight are only middling, and they feed on insects and fruits, as their beak is more or less strong.

THE WOODPECKERS (*Picus*),

- Are distinguished by their long, straight, angular bills, which are adapted for piercing the bark of trees, and searching in the crevices for insects, in which process they make a noise like drumming. Their slender tongue, armed with spines curved backwards, enables them to strike their prey, when dislodged from their cells, with great facility. Their tails are composed of ten quills, with stiff and elastic stalks, which they lean upon for a support when climbing. They are useful birds, and merit more esteem than they gain. The most remarkable are

The *Black* or *Pileated Woodpecker* (*picus martius*), thirteen inches long; black, except his head, which is adorned with a bright red cap extending to the back of the neck. Not migratory, it is found in Europe, America, and Northern Asia, where it delights to dwell in the forests. These birds chisel out, with their strong bills, a hole in the trunk of some unsound tree, where they

place their nests, which in April contain four white eggs. They are strong, active, but shy and crafty, climbing with great dexterity, but are awkward and clumsy on the ground. They live on insects, and their far resounding cry sounds like *krick, krick, krick, krick*.

The *Green Woodpecker* (*picus viridus*) is the same size with the dove; green above, white below, with a red scalp; the tongue is five inches long, and cartilaginous. It is found in the forest, where it pierces holes in the unsound trees with its strong bill, in order to bring out the insects which are preying upon the life of the tree. This it does with great intelligence and dexterity, rattling first on the bark to discover their presence. It never bores into a healthy or vigorous tree, and thus, instead of being decried as a depredator, his services in this respect ought to atone for other petty thefts. The food is exclusively insects, which are driven from their retreats by the drumming of their bills. Only when these fail do they feed on nuts. They make their nests as above described, and in April lay from six to eight white eggs. Their cry is shrill and lively, sounding like that of the tree-frog, or *yick, yick*.

The *Speckled Woodpecker* (*picus major*) is about as large as a thrush; black above, sprinkled with white; back and posterior portion of the body black; red below; the male has a stripe of red on his neck. This bird frequents thickets or gardens, where it feeds on insects, nuts, or seeds. Its manner of building is the same as already described, and at the end of March it broods over five eggs of a pure white color. Its note is *gick, gick, gick, gick*. Resembling this relative, but much smaller, is

The *White Woodpecker* (*picus medius*.) The smallest and most beautiful of this genus is

The *Grass Woodpecker* (*picus minor*), which is not larger than a lark; black and white above, grayish-white below; the male has a red head. It is very rare, seen only occasionally in the coppices of Germany, where it feeds on insects, which it picks out of moss and bark very dexterously. It builds its nest like others of the species, but places it very high. Its cry is *gick, gick, gick*.

The *Hairy Woodpecker* (*picus villosus*), Wilson and Audubon, is nine inches long, alar extent fifteen inches; crown black; wings black, tipped and spotted with white; legs and feet grayish-blue. Bill straight, about one inch and a quarter long. This species is very lively and may be seen in most parts of the Southern States, where it is quite familiar in the winter, and comes boldly to the barn-yard to glean its food, but is not considered very destructive or rapacious. Attempts to catch it by means of a net are rarely successful, its skill in excavating a passage being almost always adequate to its escape.

*Red-Headed Woodpecker* (*picus erythrocephalus*). Length, nine inches and a half; alar extent, seventeen inches; bill light blue; legs bluish-green; head, neck, and throat crimson; back, wings, and tail black, with bluish reflections; under part of the body white. The red-headed woodpecker is well known throughout the United States. In the spring and summer it is seen in every region, migrates to the south from the latter part of September to the middle of November. The exodus is always at night. They return about the first of May, and prepare their nests in the large limbs of trees, adding no materials to the cavity which they smooth out for the

purpose. The eggs, usually six in number, are white, marked at the large end with red spots. Both eggs and young often fall a prey to the common black snake. They are very destructive to fruit trees.

*Golden-Winged Woodpecker* (*picus auratus*), Wilson, Bonaparte, and Audubon. Length twelve inches ; alar extent twenty inches ; back and wings above umber color ; crimson crescent on the back of the head ; lower side of wings, tail, and shafts of most of the larger feathers golden yellow ; legs and feet light-blue. This bird, which is *Piebois Jaunt* in Louisiana, *Yellow Hammer* in New England, and *Yucker* and *Flicker* in other parts of the Union, may be said to be the least destructive of the species *picus*. They are happy creatures, climb about and around on the trees with apparent delight, rattle with their bills against the tops of the dead branches, and feed abundantly upon ants, beetles, and larvæ. The female lays from four to six semi-transparent eggs ; two broods are generally hatched in each season. Raccoons and snakes are dangerous enemies to this bird. Next to the woodpeckers come

The *Wrynecks* (*yunx torquilla*). Their tongues are without the spines ; their bills, nearly round, are of the size of a lark, brown above, streaked handsomely with small blackish waves, and longitudinal meshes of black and fawn color ; beneath whitish, with transverse blackish stripes. This bird is migratory ; it comes, like the swallow, in May, and makes its dwelling in copses, rather than forests, feeding on insects and their larvæ, but more especially on the eggs of ants. It makes its nest in a hollow tree, and lays nine white eggs. Taken young, it can be tamed. It has a habit of twisting its neck to one side in a very peculiar manner, extending the latter and

turning the head quite around, so that the bill is directed exactly backwards. As it mostly sits upright and makes a slow bowing, at the same time spreading forth its tail and erecting the feathers on its neck, it has a most singular appearance; it is very dexterous in these movements. If irritated, it twists its neck quite round, so that the bill is in a position directly contrary to the natural one. With the head thus turned towards the back, it bows and makes many ludicrous antics, and at the same time sends forth a gurgling sound from the throat. It feeds on all kinds of insects, beech-nuts, and forest seeds. Domesticated, it will eat hemp-seed, kernels, meat, ant eggs, etc. Its bird-call is *ig, gi, gi, gi*.

## II.—THE CUCKOOS (*Cuculus*),

Have moderate beaks, deeply cleft and slightly arcuate; their tails are long. They are birds of passage, and live on insects. The most remarkable of this genus is

The *Common Cuckoo* (*cuculus canorus*). Of the size of a turtle dove; throat ash gray; under surface white, marked with wavy lines of black. The plumage of the young birds, instead of gray, is reddish-brown. The cuckoo comes in the latter part of April and departs in September. It dwells mostly in groves, and feeds upon insects, wherefore it is considered a very useful bird. It is shy and rather melancholy; keeping within the deep shade of the foliage, its presence is only known by its far-sounding cry of *cuckoo, cuckoo*, uttered exclusively by the female in a volatile manner. The cuckoo differs from all birds in never building a nest for itself, nor does it ever hatch its own eggs. The female lays usually one egg, sometimes two, which are of a grayish



green, speckled and marked with gray and olive; this solitary egg she deposits in the nest of some other bird, and being no larger than that of a sparrow, it is believed the cuckoo carries it thither in her bill, as the nest chosen for the purpose is too small—mostly that of the hedge sparrow—and too well concealed for so large a bird to enter. This maneuver has, however, never been witnessed, but female cuckoos have been shot, it is said, in the mouths of which eggs have been found. The little hedge sparrows, wagtails, redbreasts, and wrens, into whose nest the egg has been intruded, brood over it carefully, and nourish the young cuckoo as faithfully as they do their own young. The cuckoo, even when taken young, can not be domesticated, but remains shy and intractable; it flies handsomely, but is very awkward in walking. Cuckoos are used as an article of food in Italy.

The *Turako* (*cuculus persa*) has a short, thick bill; the nostrils are covered with feathers; the back is of a beautiful dark green color, with soft, silk-like plumage. The under portion of the body is red, on the head is a crest, the top of which is red, and on each cheek a black whisker. It is about the size of a magpie, and can be tamed. It leaps, rather than walks, and feeds on insects, but will eat bread, fruit, etc. Its note is *kuck, kuck, kuck*, first with an interval between the notes, but afterwards closely uttered. This species is found only in Africa.

The *Honey Guide* (*cuculus indicator*) is about the size of a starling, is of a rusty red color above, white below, gray on the head, with a yellow spot on each wing. It lives at the Cape of Good Hope, and has the faculty of pointing out to man the nests of wild bees. It first excites the attention of the colonists by its grating

cry of *cherr, cherr, cherr*, uttered in the neighborhood of the bees, for, although fond of honey, it never ventures to rob the bees itself. The Hottentots and others then repair to the place whence the sound proceeds, and generally reward the bird with a portion of the spoil. The nest is very neatly made in the shape of a bottle out of the fibrous portion of the bark of trees.

### III.—THE TOUCANS (*Rhamphastos*),

Are easily recognized by their enormous beak, which is nearly as large and as long as the whole body; internally it is cellular, thin like parchment, and irregularly dentate on the edge; the tongue is furnished on each side with barbs, like a feather. They eat everything, like the raven, but prefer fruit, small birds, and insects, and receive the name of peppereaters, because of their fondness for those pungent berries.

The *Great Toucan* (*ramphastos toco*), plate 15, fig. 3, is larger than a raven; very black; throat and rump white; tail red; bill reddish-yellow above, at the base black. This bird is a native of South America, builds its nest in the holes of trees, walks very clumsily, and, like the hoopoe, tosses all its food in the air before eating it, and receiving it as it falls, swallows it whole. Its cry is *rack, rack*.

The *Green Toucan* (*ramphastos aracari*) has the appearance of a magpie; is dark green above, rump reddish-yellow with transverse stripes of red below, upper chap of the bill white, lower black; is a native of South America. These birds inhabit the primitive forests of the torrid zone, where they are found in large flocks, flying everywhere, and filling the air with their cries. They

are very shy and hard to bring within the range of a gun; but, if taken young, are easily tamed, and become very familiar. They are very noisy, and their cry is a screaming *gужacka, ke, ke, ke*.

#### IV.—THE PARROTS (*Psittacus*),

Have a large, solid beak, surrounded with a thin cere; the tongue is thick, fleshy, and round, thereby enabling the bird to imitate the human voice. They use their bills to assist them in climbing, make their nests in the holes of trees, and dwell in large companies in the shadowy forests of the torrid zone. There are many varieties.

The *Red Macaw* or *West India Raven* (*psittacus macao*) is one of the largest of this genus. About the size of a domestic cock; its color is red, with blue and greenish feathers on the wings. The upper chap of the beak is white, the lower black; the cheeks are nearly naked. It is a native of Brazil and Surinam, and feeds on sweet fruits. It bears the change to a northern climate well, but requires some care, and on account of the long, red feathers, which form the beautiful adornment of its tail, it must be provided with a high pole for a perch. These birds bite fiercely; their beaks are so hard and strong that they can split a tolerably thick branch easily. They have received the name of Arras from their shrill penetrating cry, the sound of which resembles that word, and sounds very unpleasantly: nevertheless, they can be taught to utter a few phrases, but it is not an easy task to teach them. They are fed on hemp seed, boiled maize, or rice softened in water. Of the same genus, and resembling the above described, is

The *Blue Macaw*, (*psittacus ararauna*), which is as large as a capon, has a black beak, a green, or rather blue, head; the chest and under part of the body sassafras yellow; the wings and tail blue. It does not learn to speak as readily as the red macaw, but prefers rather to imitate the notes of animals, as bleating like a sheep, mewing like a cat, etc. Home and habits are like those of the above described. Both species live in pairs, and nestle in the hollows of palm trees, where they build at the very top. The female lays two white eggs like those of the pigeon. Their flesh is tough, and can not be used except for making soup.

The *Giant Parrot*, (*psittacus goliath*), is a native of New Guinea, and as large as the red macaw. Its color is ash gray, but after being killed turns black; this singular change is caused by the loss of the fine dust with which the feathers are powdered. On its head is a large tuft or crest; when it feeds it has the singular faculty of making its tongue, when eating, into the form of a spoon.

The *Yellow Parrot*, (*psittacus solstitialis*), is about the size of a turtle dove; olive-green above, speckled yellow around the eyes, sides and thighs red; the feathers are blue without, green within. It is brought from Angola, learns to speak with great facility and pronounces well: is fed on grains, etc.

The *Pavuan*, (*psittacus guianensis*), is one of the many varieties found in Cayenne, from whence it is brought to Europe; learns to speak with facility and intelligibly, and not being very tender, is easily kept and at little cost. Its size is about the same as that of a thrush; the upper surface of the body is dark green, the lower lighter; the cheeks are speckled with red, the inside of the wings red

and yellow, and the tail very long. Much resembling it, is

The *Ground Parrot*, (*psittacus formosus*), plate 15, fig. 7, comes from New Holland, has a short bill, is slender, somewhat long-legged, of a yellowish-green color, striped transversely with dark brown; on the forehead is a stripe of red. It receives its name from its seeking its food in the earth.\*

The *Gray Parrot*, or *Jaco*, (*psittacus erythacus*), plate 15, fig. 9. Something larger than a pigeon, its color is ash gray, with a black bill and short scarlet tail. Both male and female are easily taught to speak. They come from Guinea, and subsist on grain. They are very gentle, and much prized on account of their attachment to their owners. When domesticated, they should never be fed with meat, as it injures them. Many attempts have been made in Europe to raise their young, but without success. They are easily tamed, imitate the speech of those they hear, and are very familiar, but mostly mischievous.

The *Sparrow Parrot*, or *Inseparable*, (*psittacus passerinus*), is not larger than a sparrow, green with a blue rump, and orange colored bill and cheeks. These birds, which are found in multitudes in Brazil and Surinam, are

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\* Of the two hundred species of its genus which have been found in the United States, we will only mention

The *Carolina Parrot* (*psittacus Carolinensis*),—also called *Parroquet*—is exceedingly annoying to the farmers, not only in consuming and destroying his grain, but in laying waste his orchards of fruit-trees, merely for the sake of the seeds. They come in large numbers, and are a fine mark for the huntsman. Their manner of living and habits so much resemble those of others of the race that no particular description is necessary. The seed of the cockle burr furnishes them with a staple article of food.—*Tr.*

very beautiful, and so affectionate toward each other, that if a pair are separated they die. They are nurtured like canary birds, but never have been taught to speak. Their usual note, which they are constantly uttering, sounds like that of a sparrow. They fly in great flocks, and do much injury to the rice and maize plantations. These birds are the smallest of the parrot race.

The *Cockatoo*, (*psittacus cristatus*), distinguished by its movable crest, is white, with gold colored feathers back of the long tuft on its head. The cockatoo is the drollest and most amusing of all the parrot race; is always in motion; does not speak words distinctly, but chatters constantly, and imitates tones to perfection; knows its owner, and takes great delight in swinging in a ring suspended from above. The East Indies, where there are many relative races existing, is its home. The colors vary in this species. Some have the crest deep yellow; others sulphur color. The handsomest are those with fawn colored plumage shaded into red, with the crest of purplish-red. They receive their name from their frequent repetition of the syllables *cock-a-too*.

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## FOURTH ORDER.

### GALLINACEÆ.

This order includes all our domestic poultry, and such terrestrial birds as resemble them. They have a short beak, vaulted above, their wings are short, their flight heavy, and their tails, especially those of the males, composed of handsome long feathers. The females live in troops, led by a single male, and their flesh, wholesome



and well tasted, furnishes a desirable article of food. As soon as the young escape from the shell, with the exception of the pigeons, they run about every where.

### I.—THE COCKS OF THE WOOD.—(*Crax*.)

These are tolerably large birds, found only in America, with large round tails, composed of stiff feathers. They inhabit forests, and subsist on fruit and berries. Are easily tamed, and their flesh is highly prized as an article of food. The best known of the tribe are

The *Hoccos* (*crax alector*), which are something smaller than turkeys. Their color is black, with white on the posterior part of the body and thighs. The head is ornamented with a tuft of elevated feathers three inches high. They are found in the forests of the warmer portions of America, where they live in large flocks. Are peaceful birds and easily tamed, but so passive that they will remain sitting on a tree from which their companion has just been shot.

*Cocks of the Rock* (*crax pauxi*). Something larger than the domestic cock, these birds are of a shining black on the upper surface; white on the under. Behind the bluish colored beak are rough knobs of the same color; the cheeks are of a citron yellow, and the head is ornamented with a tuft of feathers, curling outward, which the Indians use for head-dresses for themselves. Domesticated when young, they become very familiar, and on account of being so easily tamed, would be transplanted from the wild forest to the farm-yard, but—even in their own country—they can not bear the change. The flesh is excellent, and, like the above described, they are natives of America.

II.—THE PEACOCK (*Pavo*),

Is as large as a turkey. The head is ornamented with a crest, and the spreading tail of the male, glancing in metallic brightness, has ever been the admiration of the world.

The *Common Peacock* (*pavo cristatus*) has a tuft of twenty-four feathers of the most exquisite metallic green ; the body is golden green above ; black below. The distinguishing characteristic of this bird, however, is its tail, which, when erected, forms a fan of the most resplendent hues ; each feather, glancing in metallic luster, and ending in a flat vane, is decorated with numerous brilliant circles called eyes. Behind these are other downy feathers, resembling those called marabout, which the ladies wear as ornaments. Peacocks come from the East Indies, where they are found wild. They were also known to the Greeks and Romans, and cherished as domestic fowls on account of their beauty, and many in our own country keep them as an ornament to their lawns and court-yards. They live about twenty years, but do not acquire that beautiful variegated plumage of the tail, which they are proud to display. In proportion to the extreme beauty of their bodies is the intense ugliness of their feet, and they have in all times been quoted as the emblem of vanity. Their cry, heard mostly in the morning, is very disagreeable, sounding like *pao, pao, pao*. The pea-hen lays from six to twelve eggs, of a brownish-yellow, spotted with dark brown, over which she seldom broods ; therefore, those who wish to have the young peacocks, place them under a turkey-hen to be hatched. They are at first very tender, but after a

month or two become quite hardy. The white peacocks are said to be very beautiful; nevertheless, it is only in very bright sunshine that the changeful radiance of their plumage is seen to perfection. They are fond of quarreling with other birds. Many relative species are found in India.

### III.—TURKEYS.—(*Meleagris*.)

Head and upper part of the neck destitute of feathers, and covered with a flesh-colored tuberculated skin. On the forehead is a conical appendage, and under the throat, hanging from the neck, is another appendage, which lengthens and swells when the bird is irritated or excited. A pencil of stiff hairs or bristles hangs from the lower part of the neck, and the tail can be spread in a circle.

The *Domestic Turkey* (*meleagris gallopavo*), is as large as a goose, and has large spurs on its feet. It is a native of America, where, in its wild state, it is of a brilliant black, but, domesticated, is found of various colors. Vain, silly, and jealous, these fowls are fond of being seen, and as though desirous of exciting admiration, strut proudly around, with sweeping wings and outspread tail, in manifest display. They have a great aversion to scarlet, and will attack a child clothed in red. The turkey-hen lays about thirty whitish-gray eggs, spotted with yellowish-red. It is very ready to brood, therefore the eggs of other fowls are often given her to hatch. They walk clumsily, but can fly up to a high perch or tree. The flesh of young turkeys is considered a great delicacy. If well fed, a turkey will weigh twenty pounds. Like the peacocks, they are at first very tender, but soon become hardy and strong.

IV.—THE PINTADA OR GUINEA HEN.—(*Numida*.)

Rather larger than the common hen, it has scarcely any tail; the bill is short, and the cranium mounted by a callous crest.

The *Common Guinea Hen* (*numida meleagris*), originally from Africa, was known to the ancients. It is of a leaden gray color, speckled with white spots. It is always ready to fly, but does not do so easily. Kept in the barn-yard, among other poultry, it shows itself jealous and quarrelsome, and, during the whole day is utters a chuckling, grating sound, which makes it very disagreeable. It lays about thirty eggs, which are of light reddish-yellow; these are excellent for eating, and the flesh of the young is highly prized as an article of food. There are other varieties, of which one, of a fine ash gray, is considered very beautiful.

V.—BIRDS OF THE PHEASANT KIND (*Phasianus*),

Are naked around the eyes, and the cheeks are covered by a flesh colored, and, in many, corrugated skin. To this genus belong

The *Common Cocks* (*phasianus gallus*), which have the head surmounted by a fleshy comb, and wattles on the cheeks. The males are distinguished by the length and beauty of their tails, which in the females are wanting. They are wakeful, bold, jealous, attentive, and provident towards their females, and, never failing to give notice of the approach of day, by their crowing, are considered the emblem of watchfulness. Considering himself sovereign of the barn-yard, the cock will not

suffer a stranger of his own kind to invade his premises, but battles with him obstinately. In England and elsewhere, cocks are trained to fight; in the early times the practice was more general than at present. The poor birds, armed on the legs with a sharp iron spur, will fight with each other until one falls dead or exhausted on the earth, when the victor proclaims his conquest by a loud crowing.

The hen lays eggs, if well fed, nearly the whole year round, and provides for her young by leading them abroad to seek food, to which, when found, she invites them by a loud *cluck, cluck*. The excellence of the flesh and eggs are too well known to need a description. The most celebrated of the species are

The *English*, which are black, with a small tuft on the head. The *Giant* or *Shanghai*, which are brought from Tranquebar and Cochin China, and are nearly as large as turkeys, with small combs and different colors. The *Bunted*, without tails. The *Bantams* or *Dwarfs*, not larger than pigeons. The *Ragged* or *Friesland*, with the feathers curling outwards. The *Hairy*, with plumage resembling bristles, small comb, red visage, and small as bantams, and the *Moorish*, which are entirely black, including the comb, wattles, and even bones. These last-named do not look well on the table, but are, nevertheless, good eating.

The *Pheasants* differ from the above by a more cuneiform or wedge-shaped tail, inclining downwards, and being without the comb and wattles. The best known is

The *Common Pheasant* (*phasianus colchicus*), which is as large as a hen, but more slender; reddish-brown, changing to gold color, with transverse stripes of black,

head and neck dark green. The female is simply dark brown, with black stripes.

The *Pheasant*, originally from Asia, is brought to Germany from Bohemia, where it is found wild, although generally kept in aviaries. These are mostly made in places—*islands* are the most suitable, as these birds can not fly far—where there are groves of detached trees; but when such are not to be had, a space of forest is inclosed with a hedge, on which are placed snares ready for an enemy among the beasts, and in the cleared spaces nets for birds of prey. In a wild state, the pheasant dwells in copses, retired, silent, and alone, subsisting on berries, fruit, worms, etc. As these birds make no regular nest, but leave their brownish-white eggs everywhere in the forest, they are sought after daily with spaniel dogs; they are then placed under a turkey-hen to be hatched. The young require careful feeding; small grits is best for that purpose. The pheasant is a passive, silly bird, suffering itself to be taken and killed, without resistance; its flesh is highly valued.

The *Golden Pheasant* (*phasianus picus*), plate 16, fig. 4, is less than the common, but has a longer tail; it comes from China. This beautiful bird is of a golden brown color, with green meshes or sprinkles; the head and neck are brilliant yellow. The female is less dazzling, more of a rusty brown. The eggs are ochre-hued. It is also found in Europe, but is very tender. It was the golden pheasant which, in the mythological ages was never seen except in a few instances when flying, and from its extraordinary beauty attracting wonder, it gave rise to the fable of the phoenix.

The *Silver Pheasant* (*phasianus mythemerus*). Larger than the ordinary pheasant, white, neatly wa-



tered with black; head and under surface of the body black; the naked skin around the eyes is purplish-red. The female is of a rusty brown watered with gray; the eggs are reddish-yellow, dotted with white. It is a native of China, and, like the golden, is kept for ornament. It is, however, a quarrelsome bird, and bites severely.\*

#### VI.—GROUSE (*Tetrao*),

Are of different sizes, and instead of eyebrows have a naked red strip occupying the place. The principal of which are the following:

The *Great Heath-Cock* (*tetrao urogallus*), plate 16, fig. 2, is the largest of the race, one species exceeding the turkey in size; its usual weight is nine pounds. The male is almost entirely black; head and breast changing into green. The female is smaller, and of a russet, or dark fawn color. The heath-cock is a shy and cautious bird, found in northern Europe; it inhabits the mountain-forests of Germany and Sweden, where it lives alone among the thickets. Its bearing is bold and proud, its flight rather heavy. Buds, berries, insects and seeds serve for its subsistence. In March or April the male calls all the hens of his family together, and with trailing wings and elevated tail, struts proudly before them. His cry at these times is a kind of loud explosion, followed by a noise like the whetting of a scythe, and, whilst it con-

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\* The *Argus* (*phasianus argus*) comes from Asia. It is said that pheasants were first introduced into Europe by the Argonauts. The wings are covered with eye-like spots, which, when the wings are spread, give the bird a remarkable appearance. No true pheasant has yet been discovered in America.—*Tr.*

tinues the huntsman can easily approach, as he neither hears nor sees; as soon as this ceases, however, great caution is necessary, as the bird is very observant. The hens remain quietly feeding until he descends from the tree, when they receive him with loud cacklings. Sometimes two hens get to fighting with each other, and contend as fiercely as game-cocks. Taken young, they can be reared as domestic poultry. The female lays from ten to twelve grayish-white eggs, marked with yellow, over which she broods so assiduously, that she will suffer the huntsman to take her with his hand. She leads her troop of young ones like the domestic hen. Hunting woodcocks is considered fine sport.

The *Black Grouse* (*tetrao tetrix*) is the size of the domestic cock. The plumage of the male is blue-black, with the spaces around the eyes covered with a naked red skin. The female is of a dusky red; the outer feathers of the tail are curled outward, so as to form a fork. The home of this species is in the north of Europe, and the mountain regions of Germany. They are very timid birds, and their cry, sounding like a single word, is so simple, that the huntsman can collect a number together by imitating it. They feed on the same aliment as the heath-cock, and are more easily tamed. The hen makes a slightly-constructed nest in the grass, where she lays about twelve yellowish eggs, spotted with red. They are, upon the whole, silly birds, and can, notwithstanding their shyness, be lured by the stuffed skin of a male. They are called *Black-Cocks* in the Tyrol. Their flesh is highly prized.

The *Ruffed Grouse* (*tetrao umbellus*), and the *Spruce Partridge* or *Canada Grouse* (*tetrao canadensis*)—Audubon and Nuttall, are found in the

mountainous regions of the Middle States, where they are called partridges. They lay from eight to fourteen eggs, of a dark fawn color, irregularly spattered with different tints of brown. The flesh is sweet and tender, although it is said by some persons that it is poisonous after they have eaten the leaves of *Laurel* (*kalmia latifolia*), but Mr. Audubon doubts this. The Canada grouse feeds on the plant called *Solomon's Seal*, in summer, but in winter upon the leaves of the larch or hackmatack, which gives the flesh a bitter taste.

The *Hazel Grouse* (*tetrao bonasia*) is something larger than a partridge; the color a rusty red with white spots. The male has a black throat. It lives in the north of Europe and Siberia; also found in the mountain forests of Germany, where it feeds on all kinds of buds, berries, and insects. The female lays twelve reddish-colored eggs spotted with a darker tint, under some bush, and the young ones immediately on escaping from the egg run about and find food for themselves. Their note is a kind of whistle; they are very timid, and know how to conceal themselves most adroitly behind the brushwood. They run very swiftly, but make a great noise in flying. Their flesh is highly esteemed, therefore their name, *bona assa*, which means a good roast.

The *Ptarmigan* or *White Grouse* (*tetra lagopus*), plate 16, fig. 1, is as large as a partridge. Over the eyes is a handsome red spot. In winter it is white, with the side feathers of the tail black. The male is marked with black; in summer he is of a dusky red. The ptarmigan dwells among the snowy Alps, and in the north of Europe and Siberia. Its note is *cray*; its food berries, buds, grains, and insects, and it lays in its nest, which it scratches in the earth, and lines with moss, fifteen yel-

low-white eggs, spotted with brown. They are hard to kill with shot, therefore they are taken mostly in snares. Found also in great numbers in the Arctic regions of America.

The *Common Partridge* (*tetrao perdix*), plate 16, fig. 5. This well-known bird is ash-gray, with black and sorrel-colored markings; the throat is reddish brown. Partridges are found in every field and copse in companies which are called coveys. They feed on grain, insects, etc., run very rapidly, and, on the approach of danger, crouch down closely together; on the nearer advance of the foe, they all rise at once to fly, but if not at once pursued, again settle on the ground. If carefully approached at this time, they remain lying close, and a net is easily thrown over them; they are, however, most frequently shot while on the wing. Many singular methods are used for entrapping partridges, one of which is, to have the figure of a grazing cow painted on a board, large enough to conceal the huntsman, who carries it as a screen before him; thus shielded, he marches to the place where the snare is laid and a covey of them is known to be. Imitating the bellowing of a cow from time to time and advancing at the slow pace of a grazing animal, the partridges are not frightened, and neither crouching down nor flying, but anxious to keep out of way of the cow, are easily driven into the net. The partridge lays twenty brown eggs, mostly in the grain fields. The young are yellowish, with two dark brown stripes running down the back, and leave the nest so early that they are often seen with a portion of the shell adhering to their bodies. They are easily tamed, and feed willingly on barley, wheat, bread, or green vegetables. They love to roll about in wet sand. Taken

young, they become so familiar as to follow their master everywhere. The old ones live in pairs, and are faithful mates during life. Their flesh is considered a great delicacy.

The *American Partidye* (ortyx) is peculiar to America. The *Red Partridge* (tetrao rufus and ortyx virginienensis) belongs to this family.

The *Quail* (tetrao coturdix) is brown, waved with black, and white lines; over each eye is a white spot; the throat of the male is dark brown, that of the female white. It is well known as a bird of passage, coming in May and leaving in September. It is found all over the Old World, lives in the grain fields, and feeds on all kinds of insects and green plants. These birds are sometimes taken in companies and sometimes singly. When domesticated they are suffered to run about the room, but must be constantly provided with fresh greens; nevertheless, they thrive better if kept in houses built for the purpose. The female lays fourteen bluish-white eggs, spotted with brown, on the bare earth; broods equally well in a state of imprisonment. The note of the quail is first a hoarse *wirra*, then *pickawick*, which sounds, with half-closed eyes and stretched-out neck, it utters almost continually. As this cry is most frequent just in harvest time, the German farmers say the call is "Bück den Rück," which, in English, is "stoop, or bow your back;" and an old schoolmaster once explained to his scholars, that it was Latin, and meant "*dic cur hic*" ("say, why are you here?") which was a gentle hint to the boys, who deserved it, as they cared more for going after the quails than for learning their lessons. The American children liken their cry to *Bob White*, and find great pleasure in imitating it. The note of the female is *pee, pee*, which

is so successfully imitated by a whistle, that the males, deceived by it, are readily caught. These birds are said to be fond of music. Their flesh is preferred to that of the partridge. Notwithstanding their corpulence and heavy manner of flying, they pursue their migratory journey across the Mediterranean, but become so weary by the time they reach the southern shores, they can be captured by the hand. The Holy Scripture gives an interesting account of how they served the Israelites for food while journeying in the desert. The old Greeks reared great numbers of these birds, as the moderns do game-cocks, for the pleasure of seeing them fight.

#### VII.—THE PIGEONS.—(*Columba*.)

These birds form a class between the Gallinacea and Passerinae. Their bills are slightly curved, their nostrils are partly covered with a cartilaginous scale, their crops uncommonly large. They fly well, live in pairs, and lay but few eggs, over which both male and female brood alternately. They feed their young from their own bills with food first swallowed by themselves. The most remarkable is

The *Wood* or *Stock Dove* (*columba oenas*), well known as the domestic pigeon, and in size it equals the common wild bird of the same name. Its color is blue-gray, with the neck and breast dashed with a beautiful changeable green and purple. This species dwells sometimes in hilly fields or coppices, but prefers a forest where the trees are large and hollow. They feed on all kinds of seeds, brood twice a year, building their nests in the rifts of rocks or hollow trees. The eggs are white. Those of the wild pigeon are often placed in the nests of



the domestic, and being thus hatched, they become domesticated like the others, but are easily distinguished from them by their greater gentleness and the more beautiful color of their plumage. Their note sounds like *cur*, *roo*, *coo*, *coo*.

The *Turtle Dove* (*columba turtur*) is, on the back, of a tawny slate color, spotted with black; neck more bluish; has on each side a spot of mottled black and white, and is in size no larger than a thrush. Found in all the warm portions of Europe and Asia. Is migratory, and although very innocent in appearance, is not very shy. This species feeds on the seeds of the pine trees, among the spiky foliage of which they build a carelessly constructed nest, in which are laid two white eggs. They are often kept in wire cages, where they hatch. Their eggs have a very light shell. Very gentle toward each other, easily tamed, and tender, it is said they have the faculty of withdrawing disease from human beings to themselves, and the superstitious believe that they have the power of preventing catarrh or rheumatism. The note is a mournful *turr*, *turr*, *turr*, *turr*.

The *Laughing Dove* (*columba risoria*), came originally from Africa; is something larger than the foregoing; is of a light brown above; paler below, with a black collar and red feet. Sometimes it is called the Ring Dove, and frequently domesticated and kept in the house, because imagined to have the power of averting or transferring disease. Fond of heat, it keeps near the fire; feeds on wheat, millet, flaxseed, etc. A straw basket is mostly given it for a nest, where it lays two pretty white eggs, one of which only produces a young bird; the other is mostly addled. The laughing dove is very cleanly, gentle, and sociable. The male, often sinking his head

to the ground, and, inflating his chest, utters at intervals his cry of *coo-ru-hu*, varying between the notes with the laughing sound of *he-he-he*, from whence the name.

The *Domestic Pigeon* (*columba domestica*) is the species mostly reared in pigeon houses, and, as every one knows, varies much in color. Gentle, peaceable, graceful in flight, cleanly, and sociable, they are the great charm of the poultry yard. They lay only two eggs, but hatch several times in the year, making their nests in the little straw baskets provided for them. Their food consists of different kinds of seeds, vetches, peas, wheat, etc. They are so fond of anise seed, that they will follow a person carrying it. Their flesh is considered quite a delicacy. There is a species termed

The *Carrier Pigeons*, which, trained to serve as bearers of letters, are the most interesting of the race, although the instinct, which renders them so valuable, (their very strong love of home), is, in some degree, common to all the domesticated varieties. Its note is the well known *cur-ru-u-u*. There are various races of this family, greatly prized by pigeon fanciers, and are bought at enormous prices, whence the old saying,

“Does any one hate to see gold lying by—  
Let him buy pigeons and he'll find it can fly.”\*

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\* *Carrier Pigeon* (*columba livia*), known also as the *pigeon prive* of Belon, the *pigeon domestique* of Bresson, the *wild rock pigeon* of the British, and the *colommon* of the Welsh, is the stock from which ornithologists generally now agree that the domestic pigeon is derived. This bird, larger than the common pigeon, measures about fifteen inches in length, and weighs about one and a half pounds. The neck is long, and the pectoral muscles very large, indicating a power of vigorous and long-continued flight. An appendage of naked skin hangs across the bill, and continues down on either side of the mandible. According to its size and shape the amateurs of carrier pigeons estimate the value of the bird, considering those best that have the

The *Passenger Pigeon* (*columba migratoria*) is smaller, bluish-gray, the breast vinaceous. Are found in America in such immense flocks that it is said the sun is really

appendage high on the head, and also distinguished by a wide circlet around the eyes, destitute of feathers. The mode of training them in Turkey, where the art is supposed to be carried to the greatest perfection, is this: the person who has charge of rearing them, watches until the young pigeons arrive at full strength of wing, and then takes them in a covered basket to a distance of about three quarters of a mile from their home; they are then set at liberty, and if any of them fail in returning from this short distance, they are considered stupid, and rejected as valueless. Those that return are then taken to greater distances, progressively increased from two to one thousand miles, and they will then return with certainty from the farthest parts of the kingdom. In England it is usual to keep these birds in a dark place for about six hours before they are used; they are then sparingly fed, but have as much water given them as they will drink. The paper on which the message is written should be carefully tied around the upper part of the bird's leg, but so as in no wise to impede its flight. In olden times it appears that the original way of suspending the dispatch was from the wing, or around the neck, but the above method is that now adopted. The antiquity of the application of these birds to the purpose of bearing intelligence to distant parts or persons, and the perseverance with which some varieties—that which is named, from its peculiar fitness, the *Carrier*, more especially—when well trained, will return from long distances, is well known; but it is not known when, or by whom, the pigeon was first applied to this purpose. The bearer of every kind of news, in ancient times these couriers of the air conveyed tidings of the movements of contending armies to each other. Anacreon's dove was employed on a more gentle mission; and the news of victory won at the Olympic games was transmitted on the same day on which it was achieved, by these feathered messengers. There is good authority, as early as in the reigns of the second and third Edwards, for saying that Asiatics used them for the same purpose as the Romans. During the Crusade of St. Louis, they were so employed. Tasso presses them into the service in the siege of Jerusalem, and the other poets of the time mention them as heralds of victory and defeat; the bearers of tidings which told of sorrow or of joy.

The ordinary rate of flight of carrier pigeons is not generally held

darkened by their flight. They migrate from one country to another, and are the terror of the husbandmen, for they devastate the fields where they alight.\* By day

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to exceed thirty miles an hour. One, however, sent in consequence of a wager, made its way from Bury St. Edmund's to London, in two and a half hours, having traversed seventy-two aerial miles in that time. When the annual trial of the prize for the best carrier pigeons was decided in Ghent, on June 24, 1833, twenty-four birds which had been conveyed from that place, were thrown up at Rouen at fifty-five minutes past nine o'clock in the morning. The distance is one hundred and fifty miles. The first pigeon arrived at Ghent in one hour and a half; sixteen came in within two hours and a half; and three in the course of the day; four were lost.

These birds also, when loosed from a balloon at a great height, have, after flying round and round, returned to the balloon for want of objects to guide them on their homeward flight. And yet there is on record a wonderful instance of their return to their domicil under circumstances of great difficulty as far as concerned guide-marks.

"The battle of Solebay was fought May 28, 1672. A number of pigeons—great favorites of the commander—kept on board of the *London* man-of-war, on the first firing flew away. Nowhere were they seen near during the fight. It blew a brisk gale next day, and the British fleet was driven some leagues to the southward of the place where the birds forsook the ship. The day after back came the pigeons, not all in one flock, but in small parties of four or five at a time, until all the birds were safe on board. This unexpected return caused some conversation on board, when Sir Edward Spraggs told those that expressed their surprise, that he brought those pigeons with him from the Straits, and that when he left the *Revenge* for the *London*, all those birds, of their own accord, deserted the *Revenge* and removed with the seamen to the *London*."

These were not carrier, but only common dove-cote pigeons, and it serves to prove that a hereditary instinct exists in all the race, and that the love of home, from which proceeds the educational faculty of the trained, is found equally strong in the original unimproved race.—CYCLOP. AMERICANA.—*Tr.*

\* The rapidity of the flight of this species is almost incredible. It is alleged of them that they fly at the rate of a mile a minute. The passenger pigeon has been shot in the neighborhood of New York

they are industriously employed in ravaging the forests and plantations; at night they seek a roosting-place in the woods, which are never thus occupied without exhibiting traces of their desolating visits. The earth is torn up, branches are broken from the weight of the heavy group resting upon them—for many millions, it is said, compose this formidable troop—and sometimes from fifty to one hundred nests are found on the same tree. If the brooding-place is discovered, man commences his work of devastation. Armed with axes, the enemy reaches the spot ready to seize and destroy. The trees are felled; the young pigeons fall or are shaken to the ground; some are shot; many people are employed in salting what they expect to use; and, last of all, hogs are driven into the woods to fatten on the remainder.

The *Crown Pigeon* (*columba coronata*) is the largest

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with its crop full of rice, which the bird could not have procured nearer than the rice-fields of Georgia or Carolina. Audubon, who relates this startling fact, observes "that as their digestive powers are so great that they entirely decompose food in twelve hours, the birds which were killed in New York must have traveled between three and four hundred miles in six hours." The passenger pigeon would thus, as this celebrated naturalist observes, "be enabled, were it so inclined, to visit Europe in less than three days." Others maintain, however, that something more than inclination would be required to enable the bird to pay the visit intimated; for rapid as are its powers of digesting alimentary substances, equally rapid is the failure of strength when deprived of food; and a bird can no more endure many hours of total deprivation of sustenance than a man can support as many consecutive days; so that unless the passenger pigeon were to take a wallet of rice under his wing, he would have but little chance of reaching the term of three days' journey, unless he should calculate on stopping by the way, and taking a meal on board of one of the mail steamers, as at a half-way house, and on finding a second on which to roost, since the pigeon is not nocturnal.—CYCLOPEDIA AMERICANA.—Tr.

of the race ; almost the size of a turkey. Its plumage is a slate blue ; the upper surface a cinereous brown, with a beautiful tuft of filamentous feathers on its head. It is a native of New Guinea ; coos or murmurs like the rest of the species, but utters an occasional howl. In the East Indies it is kept as poultry, and its flesh highly prized. If well fed it often weighs ten pounds.

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## FIFTH ORDER.

### W A D E R S.—(*Grallatoræ*.)

Birds of this order are remarkable for the length of their legs, the lower part of which are naked, enabling them to go a considerable distance in water without wetting their feathers. Their necks and beaks are also long, and the latter well fitted for seeking their prey, which is found, for the most part, in shallow water.. The greater number of these birds live on fish, amphibia, worms, or insects ; comparatively few content themselves with seeds and plants. The external toes are, in some, bound to the middle one by a palmate membrane ; in many the posterior toe is entirely wanting. With the exception of the ostrich and cassowary, they all have long wings and fly well. Other birds fold their legs close to their bodies when flying, whereas these extend theirs behind them.

### I.—OSTRICHES.—(*Struthio*.)

The family of the *Brevipennes* or *Censores* is divided into two genera. Their wings are composed of loose,



flexible feathers, and although unsuited for flight, aid them in running. These feathers are much prized on account of their beauty, and are well known as an article of dress. The beak is flat, and not very long; the tongue short; eyes very large, and fringed with eyelashes. Two species are known.

The *African Ostrich* (*struthio camelus*), plate 16, fig. 3, has but two toes, and considered the largest of birds. It attains six or eight feet in height. Their bare, flesh-colored legs are very long. The head and neck are covered with a coarse hair. The feathers of the wings and tail are flexible and wavy; white, with black borders. The ostrich lives in Africa and Arabia, and in swiftness can outrun a horse. Feeds on grass, fruit, grain; is so very voracious that it will swallow metals. In running it uses its wings to assist its speed, and can be tamed so as to carry a rider on his back. If attacked he uses his feet as a weapon of defense, by throwing up stones and clods against his pursuer. The ostrich has been described as a silly creature, which, on the approach of danger, buries its head in the sand, and believes itself safe from the enemy it can not see. This, however, is not so. It is prudent and far-sighted, and takes to flight on the least alarm. The eggs weigh three pounds each, are well-tasted and nourishing, and keep for a long time; they are yellow, dotted with black, and have a very hard shell. The female scratches a kind of nest in the sand, where she lays about thirty eggs, of which seldom more than twelve are hatched. Male and female sit on them alternately; the female by day, the male at night. The superfluous eggs furnish the first food for the young, for as soon as they are out of the shell, the old birds break them with their feet, and feed them with the contents.

In warm countries the ostrich often leaves its nest for a long time, covering the eggs, however, carefully with sand, from whence has arisen the supposition that those birds never brood, but leave their eggs to be hatched by the sun. The flesh of the young ostrich is eatable; that of the old, hard. They are hunted on horseback, and pursued until, spent with fatigue and famine, they yield quietly to their conquerors. The value of the plumage, worn as ornaments, is well known. The egg-shells, which are very hard, are made into carved cups, etc. The flesh is eaten, and the fat, used for many purposes, is highly prized among the Arabs as an article of food.

The *American Ostrich* (*struthio rhea*), the largest bird of South America, is over four feet high; ash gray above, mingled with brown and yellow; yellowish-white below, with scarcely any tail. Its wings support it in running. The action of this bird, while being pursued, is very odd. Its course is always in a zig-zag direction, so that the rider has much trouble in overtaking it. It feeds on grass, herbs, fruit, etc., and although found in the forests, mostly dwells in the vast plains. The female, like the African ostrich, scratches a nest in the sand, in which she deposits sixty eggs. Of these she only hatches a part, breaking the others in order to feed the young with them. These eggs, weighing two pounds each, are very palatable. The birds of this family are very shy, and so fearful that they fly from a shadow. Taken young, they become as tractable and familiar as poultry. Their flesh is fat and well tasted. The feathers are used for fly-brushes, the neck for money bags, and a part of the skin for caps. Drinking cups, sometimes handsomely carved, are formed from the egg-shell. The bird itself often weighs fifty-six pounds.

II.—THE CASSOWARY (*Casuarus*),

Have shorter wings than the ostrich, on the feet are three toes, and their feathers are so lightly fringed that they resemble hairs.

The *East India Cassowary* (*casuarus indicus*) has the bill flattened sidewise; the head and neck are naked; the head is surmounted with a helmet-like crest, and two long wattles hangs in the front of its neck. The horse-hair-like feathers are black; the wings are armed with stiff quills, which, long and spur-like, it uses as weapons of defense. The cassowary runs as rapidly as the ostrich. About the same size and very strong, it can, like it, defend itself boldly with its beak and feet. It has, it is said, a particular aversion to the color of red. Its food is the same with that of the ostrich, showing, however, a great preference for bananas. Taken young it is easily tamed, but is always stupid and malicious. Its eggs, which it leaves in the sand, to be hatched by the sun, are mostly four in number, of a greenish-white, spotted with a brighter tinted green. There is a similar species in New Holland (the Emeu), which is the largest of the ostrich race, differing only in not having the horny crest.

III.—THE BUSTARDS (*Otis*),

Resemble the gallinacea in the form of their bodies, but their habits are the same as those of the ostrich.

The *Large Bustard* (*otis tarda*), plate 16, fig. 8, is the largest of European birds; about four feet high, thirty pounds in weight, of a bright fawn color, watered or crossed with black; the male has a mustache. These

birds are found in North Germany, Southern Russia, and Greater Tartary, and are mostly seen in the naked and extensive plains of those regions, where they wander in troops and find plenty of food, namely, grains, earth-worms, etc. The males quarrel and contend fiercely with each other, and, like the turkey cock, can spread the tail like a fan. The hen bustards lay from two to four eggs of a pale olive-brown, marked with spots of a darker color, and know well where to place their nests so as to secure them from intrusion; for, as they do not fly well, they are ever on the watch against the approach of danger. The young bustards run with their mother. Their bodies are covered with down or rather wool-like feathers of a gray color, striped with paler. Very fearful and shy, sportsmen find it a hard matter to get near them; they are sometimes hunted by mounted huntsmen and run down by greyhounds. The young are easily tamed, and their flesh is delicate and palatable; that of the old bustards is hard. The other families of the race are

The *Little* or *Dwarf Bustard*, which is no larger than a pheasant, and

The *Ruffed Bustard*, which is distinguished by its beautiful collar of feathers. Next to these comes

The *Golden Plover* (*charadrius pluvialis*), which, something larger than a thrush, is black, spotted with greenish-yellow, white beneath, head and neck of a golden color. This beautiful bird is found in all the northern regions of the world, migrating in winter towards the middle seas, but returning in March. Their flesh is delicate and much esteemed. It feeds on worms, insects, snails, and berries, makes a nest in among the low hedge rows or furze-bushes, where it lays four greenish-yellow eggs, spotted with brown. The birds of this genus fly

at night, very high in the air, and utter a note resembling *thui*.

The *Lapwings* (*tringa vanellus*), plate 17, fig. 2, are as large as the woodpigeon, and have an anterior toe; the upper surface of the body is black, which, in the light, changes to purple; head, breast, and tufted crest black; ends of the tail-feathers bronze-black. These birds inhabit middle Europe and Asia, and are mostly found in the neighborhood of streams. Their movements are very amusing and singular, using a great many stratagems to divert the huntsmen and dogs from the vicinity of their nests; they keep up an incessant screaming of *peewit*, from which they, in many places, are called by that name. The female makes her nest on dry ground near some marsh, where she lays two olive colored eggs, spotted with black; these she guards with the most assiduous care. The eggs are very palatable, but the flesh has an unpleasant odor. Lapwings are considered useful, as they destroy the larvæ of insects.

The *Oyster-Catchers* (*hæmatopus ostralegus*), plate 17, fig. 1, by some called the *Long-Legged Plover*, are as large as a crow; wings are striped with black and white; the long, quill-shaped beak, eyes, and legs red; are found in great numbers on the sea coasts of northern Europe and America, where they are seen to follow the waves both in their ebb and flow in search of marine insects, rather than oysters or other muscels, as has been falsely stated. They feed on worms and snails. They lay three yellow eggs, spotted with brown, in the neighborhood of the beach; these are said to be well tasted, but the flesh of the birds is bad.

IV.—THE CRANES\* (*Ardea*),

Have a long, thick, sharp-pointed bill, the legs are long and slender. The Herons rank among the most beautiful birds.

The *Common Crane* (*ardea grus*) is over four feet high; body ash-gray; forehead, neck, throat, and wings black; the tail-feathers are gray. These birds choose the cold regions of Europe and Asia for their abode, come down into the southern parts in winter in large flocks, and always fly in a triangular column as they pursue their migratory course. From the noise made by their wings in flying and their loud screaming, by which they direct their flight, often heard in the clouds when the birds themselves are unseen, has arisen the wonderful tale of Arthur's wild chase. If hungry or weary, they stop to eat and rest, which they do by standing on one foot. Their usual food consists of amphibia, snails, worms, and grain. They lay two grayish eggs, spotted with brown, among the rushes. The young become very tame; their flesh is considered good eating. Their carriage is proud, stately, and serious; but, it is said, that sometimes they are so sportive as to seem to dance. They are peaceable denizens of the poultry-yard.

The *Crowned Crane* (*ardea pavonia*), known also as

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\* This, the family of *Cultirostres*, is divided into three tribes, viz., *Cranes* (*grus*), *Hérons* (*ardea*), and *Storks* (*ciconia*). The *Whooping Crane* (*grus Americana*)—Bonaparte and Audubon—also called the *Sandhill Crane*, is peculiar to the United States. Habits the same. Their feathers are long and beautiful, and much used for making fans and fly-brushes. This stately crane is white, primaries black, and with black shafts; the whole crown and cheeks bald. The largest of all the feathered tribes in the United States.—*Tr.*



the Balearic crane of Pliny, is as large as the foregoing; very slender, the upper surface of the body slate color, the under white, the posterior portion of the trunk tawny, the wings white, cheeks rose color, and the head adorned with a beautiful crest of yellow filaments rather than feathers. It comes from Africa, and in its own country is very tame; it is sometimes brought to Europe and America by menagerie keepers.

The *Heron* (*ardea cinerea*), plate 16, fig. 9, is three feet high; of a bluish ash color, white below, with a black tuft on the occiput; is found everywhere in the north of Europe and Asia, but migrates, like the crane, in winter to Greece and Italy. The food of these birds is the same; but they build their nests on high trees or cliffs, of sticks or reeds, and line them with wool or feathers. The female lays four eggs of a pale color. Their feathers are very handsome, and, highly valued as ornaments, bring a high price. These birds are killed, partly on account of their devastations on fish ponds, and partly for the value of their plumage, as well as their flesh and eggs, both of which are considered very good eating. There is one species, called the *Egret*, which is larger and entirely white.

The *Bittern* (*ardea stellaris*), plate 17, fig. 10, is of a tawny yellow, spotted and barred with black; the feathers on the neck form a kind of collar. It is found in Middle Europe and America, but migrates towards the South on the approach of winter. It is a melancholy and sullen bird, sitting in one place during the whole day, but at night it sends forth its dismal boomings, which are truly terrifying, and so loud that the bellowing sounds can be heard at the distance of a mile and a half. Its common note sounds like *krau, krau*,

but every bellow like *eëprumb*, *prumb*. This bird makes severe resistance when wounded or pursued. Its food is the same as others of the species. Its nest is made among the reeds, and contains four pale green eggs. The young are easily tamed, and the flesh greatly prized by the luxurious.

The *Stork* (*ardea ciconia*) is more than three feet in height, white, with some of the wing-feathers black; the bill and feet are red. These birds are found in all the countries of Europe except England, and are migratory, observing great exactness in the times of their departure and return; coming in the beginning of March, and leaving in September. The male comes first, and finding the nest in good order, goes back and brings his mate. Their flight is graceful, and resembles sailing, their carriage grave and majestic. They sleep resting on one leg, and feed on reptiles, insects, etc., but will not refuse young hares, quails, and other delicacies of the same kind. The female lays five white eggs, and attends to the wants of her young brood most carefully. They have no regular note; the old ones hiss, the young twitter; nevertheless they make a very peculiar clashing noise by striking their broad mandibles together. The storks are everywhere held in high veneration, and protected by all on account of their usefulness. The young are easily tamed. There are storks of which the plumage is black; they are, however, rare.

The *Marabou Stork* (*ardea dubia*) is from six to seven feet high, and on this account has been termed the Giant Stork. The bill is uncommonly long and thick; the head and neck are naked; on the latter is a singular appendage like a large sausage; the feathers from beneath the wings hang over the tail; these, very beautiful,

long, silky, and fine, are those light plumes, called by the French *Marabouts*, and form a costly ornament for the toilet. This bird inhabits Africa and the East Indies, and is protected on account of its services in the removal of reptiles and other nuisances. Domesticated, it will march like a soldier in front of its master, and at dinner time take its place behind his chair; therefore it has received the name of *Adjutant*.

The *Spoonbills* (*platalea leucorodia*), plate 16, fig. 6, are as large as the heron, with the legs and neck shorter and white; the feet are black, the beak flat, and widened at the fore end into the shape of a spatula. These birds inhabit the shores of the Black and Caspian seas, where they live on water reptiles and small fish, after which they swim or dive. In winter they go to India. They make their nests, which contain two white eggs, spotted with brownish-yellow and red, in the reeds amidst the water. The American spoonbill is of a beautiful pink color.

#### V.—LONGIROSTRES.

The birds of this family are distinguished by a long, slender, and feeble beak, which is only suitable for rooting in the mud, in search of worms or insects. These *grallatoriæ* form two tribes, the Snipes and Avosets. To the first belongs

The *Genuine Ibis* (*ibis religiosa*), which is about the size of a hen; the legs are longer, the plumage white except the ends of the primaries of the wings, which are black; a portion of the head and neck is destitute of feathers and black; the long feathers of the tail are also black. This bird is celebrated on account of the religious worship it received from the Egyptians. It was

reared in their ancient temples and embalmed after death. It was considered the emblem of innocence, and any one who killed one of these birds by accident or otherwise, was severely punished. This species is found in Africa in the neighborhood of Lower Egypt, where it only remains from June until January, or during the inundation of the Nile; it never broods in Egypt. Its pace is slow and measured.

The *Great Ibis* (*tantalus ibis*), known in the early times, was a native of Senegal, and as large as a stork. In South America is found

The *Scarlet Ibis* (*ibis rubra*), the most beautiful of the race, something smaller than the above-named, of a brilliant red color, with the ends of the wing-feathers black. The young are gray until the third year, when their plumage gradually changes to scarlet. They frequent the marshy shores of the large rivers of South America, and feed on worms, muscles, and fish. The birds of this genus are easily tamed, but can not live long imprisoned. The feathers are prized as ornaments of dress.

The *Common Woodcock* (*scolopax rusticola*). In size the same as a partridge, and found all over Europe as a bird of passage. The upper surface of the body is rusty red, striped with black, breast and under portion are of a foul white, marked with lines of brown; the bill is straight. Every evening after sunset these birds sally forth to seek their food, consisting of larvæ, slugs, and aquatic worms, which they find in marshy meadows. Their flight is heavy and ungraceful. They migrate southward in October, and are then shot or taken in traps; in March they return, and are again subjects for the chase. They build their nests on the ground, mostly in lonely, damp

copses, between the mosses and long grass found there ; in May these contain four pale yellow eggs, spotted with dusky red and light brown. Their cry is mostly *zig, zig, wauk*, but on the approach to their nests it is *dack*. Their flesh is considered delicious, the entrails, which are not removed, particularly so, and supposed to derive their peculiar flavor from the quality of their food.

The *American Woodcock* (*scolopax minor*) differs from the European species in the temperature of the climate selected for its residence. It is found in the Middle States in summer, migrates south in autumn. The sensibility of the end of the beak, as in the snipe, is sufficiently acute to enable it to collect its food by the sense of touch without using the eyes.

Wilson's *Snipe* (*scolopax gallinago*) and *American Avoset* (*recurvirostra americana*) arrive on the coast of Cape May, in New Jersey, late in April, and early in October retire with their young to winter in the South. The American species closely resembles those of Europe.

The *Snipe* or *Beccasine* (*scolopax gallinago*) is something less, with a longer bill ; is blackish, striped with tawny ; brown and gray on the back ; the lower surface is white, waved with brown ; on each side of the head is a long black line. In flying, it mounts high in the air, and descends as rapidly as it rose ; uttering a cry like the bleating of a goat, it is sometimes called the *Sky-goat* ; its usual note is, however, a hoarse *katsh—greck—greckah*. The snipe makes its nest in spots of moorland inclosed with low copsewood, and upon the bare earth ; the eggs are five in number, olive-green, dotted with brown. Their food consists mainly of worms, slugs, and aquatic insects, but they will also eat grain ; their flesh is justly reckoned, by epicures and others, a

great delicacy. There are many other species of snipe, both in Europe and America, all bearing strong resemblance to each other.

The *Large Plovers* or *Curlews* (*numenius aquaticus*), plate 16, fig. 10, are nearly the size of our common hens; their beaks are arcuated, and their plumage like that of the larks; they are very shy, and fond of solitude; live on worms and berries; their flesh is only tolerably good. These birds are found in all the northern countries of Europe, but retire as far south as North Germany to breed. Their nests contain four eggs of pale olive color, marked irregularly with brown.

The *Sandpiper* (*tringa pugnax*), plate 17, fig. 3, something smaller than a snipe, is found every where in Europe and America, in the neighborhood of water, and migrates toward the south in late autumn. The plumage is of varied hues, but is mostly found mixed up of gray, brown, white, and black, with a collar of long feathers round its neck, and a tuft on the back of its head, which it ruffles when irritated; face, feet, and bill are red. Its food and habits are the same as those of the snipe. The males are more quarrelsome than any others of the feathered race, and fight so fiercely, that whilst contending they are easily captured; and even when a number are confined together, the strong will battle with and subdue the weak. They build their nests in flats or meadows in the neighborhood of waters, and have, in May, three or four olive-green eggs, dotted and marked with reddish-gray and olive-brown. Their cry is a hoarse *krak, krak, krak*. Taken young, they can be tamed; domesticated, they lose their fighting propensities, and are fed on bread, cheese curds, crushed grains, and, sometimes, meat.



The *Sea Lark* (*tringa cinclus*) is a swamp bird, about the size of a thrush, and frequents the shores of rivers, large ponds, and lakes. Dark ash gray, varied with blackish lines above; clear white below; breast marked with dark brown, and a white stripe over each eye. It is a very active, lively bird, and always in motion. Its bird-call sounds like *hidaza*, and when catching insects, on which, together with worms, it usually feeds, it creeps after them softly, like a cat, and snaps them up swiftly and with great dexterity. It is easily tamed, and when domesticated, is fed as the nightingale.

#### VI.—SWAMP BIRDS.—FAMILY OF MACRODACTYL OR LONG-TAILED GRALLATORIÆ.

The bill is more slender and strong. Most of them have very long toes, fitted for walking in the grass of marshes, the best known of which is the

*Avoset* (*recurvirostra avocetta*), sometimes called *Sword-bill*, plate 17, fig. 4. This bird is about the size of the lapwing. White, with the top of the head black, and three black stripes on the wings; the legs are of a bluish-gray, with a connecting membrane between the toes; the bill is considerably curved upwards. It inhabits the warmer countries of the Old World, and frequents the neighborhood of fens and seas; sometimes, but rarely, is found in Hungary. It wades the whole length of its legs in water, swims badly, is very shy, and flies rapidly. Fish-spawn, crabs, mollusca, etc., constitute a portion of its food. The avosets herd much together, especially in brooding time, and make their simply constructed nests near each other on the strand. These contain, mostly, three green eggs, spotted with brown, which

are eatable. Their flesh, however, has a fishy taste. The usual note is a soft *qui, qui*.

The *Clapper Rail*, or *Mud Hen* (*rallus crepitans*), abounds in the Middle and Southern States. It is very numerous on the extensive salt marshes of New Jersey, where they are intersected by numerous tidewater ditches. It winters near to or within the southern boundaries of the Union.—*Tr*.

The *Crex*, or *Land Rail*, (*rallus crex*), sometimes called King of the Quails, because, from the circumstance of arriving and departing with them, and keeping on the same grounds, it was believed that he led them. About the same size of the quail, it is fawn-colored, spotted with black on the upper surface; grayish on the lower; the legs are red. The discordant notes of the male may be heard every morning and evening, in the fields and meadows—*arr, arr*. The rail seldom flies, but runs with great rapidity after insects, or through the grass in search of seeds, which serve it for food. The female lays twelve yellowish-white eggs, spotted with brown and grayish-green, on the bare earth. The young can be tamed, and resemble young chickens. They become very familiar, and purr like a cat. They are fed on grain of different kinds, and their flesh is very good eating.

The *Coots* (*fulica*). *Moor Hen* or *Green-Footed Rail* (*fulica choropus*), plate 17, fig. 9, is about the size of a common hen; dark gray below; olive-brown above; breast and under surface marked with white; bill red, and feet green. These birds are lively and familiar. Swim well, although their feet are not palmate. Their nests, built among the reeds, are so artistically constructed that they can not be injured by the rising of the water, but, fastened securely, swim without danger of being

washed away. They are expert divers, and it is very hard to get them within shooting distance. They feed on insects, seeds, and aquatic plants. Their eggs are pale reddish-yellow, marked irregularly with lines of gray and brown. Taken young, they can be domesticated, and live with the hens in the poultry yard. Their flesh is highly esteemed. Their notes are *crex*, or *kir crex*, *crex*. There is another species, which is altogether black. The last of this order,

The *Flamingo* (*phoenicopterus ruber*), plate 16, fig. 7, is distinguishable from all other birds by its uncommon structure. Its body is not larger than that of a goose; nevertheless, from the disproportionate length of its legs and neck, it reaches to six feet in height. The bill is crooked; the plumage white, tinted more or less with deep scarlet. It is found in the tropical regions throughout the whole world, sometimes, in very hot seasons, coming northward. The flamingoes always appear in troops. On the approach of danger, one of them, being posted as a sentinel, utters a braying cry resembling the shrill sound of a trumpet, and instantly the whole cohort are on the wing. Their flight is like that of the wild goose. Their gait is slow and majestic; they live on shell-fish, insects, spawn, etc., which they obtain by means of their long neck and hooked mandible. Their flesh is very delicate, and the ancient Romans considered their tongues as the highest table luxury. They abound on the shores of the Caspian sea.

## SIXTH ORDER.

## SWIMMERS OR PALMIPEDES.

The feet of these birds are arranged for natation. They are placed far back on the body, are short, and have the toes united by a broad membrane. Their plumage is close, lustrous, and lined with a thick down next the skin. They have large glands in the posterior portion of the body, which secrete an oily fluid. This fluid is spread over their feathers, which, thus imbued, protect them against the water, on which they dwell. Four families belong to this order.

I.—THE DIVERS (*Brachypteræ*).

Have the legs placed very far back, which renders it very laborious for them to walk. Most of them fly badly, on account of their short wings, but swim or dive with great dexterity. To these belong, first,

The *Crested Grebe* (*podiceps cristatus*), plate 17, fig. 8, is about the size of a duck ; dark brown above ; white below ; exterior edge of the wings white ; head black, and over the eyes and top of the head a crest of yellow feathers resembling a horn. It is found in all the countries of middle Europe, by lakes and seas, and like the water rail, makes its nest among the reeds, where it swims safely on the surface of the water, and contains four white eggs. Their toes, instead of having a broad membrane between them, are furnished with simple lobes. They feed on insects, small fish, and aquatic plants, and fly in companies like wild ducks. The most beautiful muffs are made from the skin.

The *Loon*, or *Northern Diver* (*columbus glacialis*), is very large; two and a half feet long; black above; white below; head and neck dark green. Its dwelling is among the icy inland seas, so that its nest is seldom seen. Solitary and sullen, it will not endure the approach of any other bird, and lays, close to the shore, two eggs of a brownish-gray, spotted with a darker tint. It flies very high, and often among its rocky surroundings utters its boding cry of *uhu*. It often sleeps upon the water with its head under its wing, and its voice fills the mariner with dread, for it is the sure herald of a storm. The flesh can not be eaten. The different species of the auks resemble the loon so closely that no further description is necessary.

The *Penguin Tribe* (*aptenodytes demersa*) comprises palmipedes which can not fly. Their wings are short, and covered with mere vestiges of feathers; their feet are also short, and, placed farther back than those of any other bird, support them only when they rest upon the tarsus; they walk slowly and awkwardly, but are graceful swimmers. They move through the water with great rapidity and ease, diving frequently. In size about the same as a duck, with a hooked bill. The plumage is black above, white below, with two black stripes running obliquely. Are found at the Cape of Good Hope, where they congregate in troops on the sea shore. They look like a company of dwarfs when they walk, and make a trampling noise as they fly, which they do badly, so that one can imagine the approach of horses. When on land they are easily taken, and are mostly killed by a blow from a stick; they can bite severely, however, in self-defense, and bray like an ass. Their nests are oven-shaped, and contain mostly three foul yellow eggs, which

are considered very good eating. They live on fish; their flesh is oily, and not fit to eat. There are several species, and they are found only in the Antarctic seas.

## II.—FAMILY OF LONGIPENNES.

These birds have long, slender wings, like the swallows, with sharply-pointed bills; in some they are arcuate.

The *Petrels* (*procellaria pelagica*) resemble the swallows; color black, with transverse bands of white on the wings; are found in every sea, and walking seemingly on the surface of the water, receive their name, *Petrel* (*Little Peter* or *St. Peter's Birds*), from the miracle of the apostle's walking on the Lake of Genessaret.

Finding something on the water that may serve for food, they stop to examine it, in the meantime sustaining themselves on the surface by a movement of their wings. They are nocturnal, and seek their food only in the morning and evening twilight. Their shrill cries are frequently heard during the night. When a tempest is at hand, they leave the open sea, and seek the cliffs. They are so fat that the whole body is used as a lamp, and the inhabitants of the Feroe islands draw a wick through it, making it serve as a candle. Their food consists of worms, insects, small fish, etc. The female lays her single white egg in the hollow of some rock, taking no trouble to make a nest. There are several species, but the habits of all are the same.

The *Albatross* (*diomedea exulans*), plate 17, fig. 6, is larger and heavier than a swan; white, with blackish lines on the body, and black on the wing-feathers; the bill is strong and curved. These birds live in the neigh-



borhood of the southern capes, where they are found in large companies; they are the largest of all oceanic birds, each weighing thirty pounds; their cry resembles the bray of an ass. The female lays, in a rudely-built nest, several large white eggs, over which she broods so assiduously, that she never flies on the approach of a stranger, but defends them bravely. The eggs are said to be palatable, but the flesh is very hard.

The *Gulls*—*Mouettes* (*larus catarrhactes*), are as large as a raven; brown above, rusty red below; on the wings are transverse bands of white. These birds are found everywhere, but abound in Iceland and Greenland, where they brood among the rocks. They are very prolific, several hundred young mouettes are often seen in a troop, over which the old keep a careful watch. It is a hazardous exploit to go after the eggs; not only is the life of the seeker endangered by climbing the steep crags which overhang the sea, but also from the fierce attacks of the birds, for so furiously do they contend in defending their possessions, that they often impale themselves on the sharp knife which the invader holds over his head.

Gulls belong to the class of rapacious birds; they seize the young and eggs of all others, and feed on all kinds of flesh, whether killed by themselves, or found dead.

The *Laughing Mouette* (*larus ridibundus*), about as large as a crow, is found in all the inland seas of Europe; light gray above, white below; the head is a brownish-black. The *Mews*, as they are commonly called, may be seen constantly hovering, with slow sailing flight, over waters, to prey upon small fish, etc., which, having discovered, they rest upon the surface, with their bodies half-immersed. They lay their eggs among the reeds, mostly three, which are olive-green, speckled with brown,

and considered very delicate eating, but the flesh is not good. Their usual cry is a discordant *kriah*, but when placed on the defensive, they are very clamorous, and keep up a harsh screaming of *krrr—krek—ek—ek*.

The *Sea Swallows* or *Terns* (*sterna hirundo*), plate 17, fig. 7, are as large as a pigeon; their plumage is white, with the back pearl gray; under part of the head pearl gray, feet and bill red. These little birds live in great flocks on the shores of all the northern seas. Worms, insects, small fish, etc., constitute their food; their cry is shrill and penetrating, sounding like *kriah*, *kreck*, *kreck*. The female lays her eggs on the sea shore; these are mostly three in number, spotted thickly with dark brown. Sometimes they visit the inland seas or lakes. In their movements and actions they much resemble the swallow.

The *Skimmers* or *Cutwaters* (*rhynchops nigra*) are the same size with crows; black on the upper surface; the forehead, tip of the tail, and under parts are white, with a bar of the same across each wing. The bill is of a very singular structure, the upper chap, or mandible, being above an inch shorter than the under; both being flattened so as to form simple blades, which meet without clasping; they are therefore, by many, called the Razor-bills. These birds never feed on land, but skimming over the surface of the water, and protruding the long under mandible, they soon find some wandering fish, which is at once enclosed between these singular chaps, and swallowed as they fly. They walk awkwardly and do not swim. The warm regions of America are their homes. Their cry, *ga*, is very discordant and unpleasant. The female lays three white eggs, spotted with black, in the sand; they are not good to eat, tasting like

train oil. They can open oysters or muscles quite dexterously by means of their bills; thrusting the lower chap between the shells, they eat the inside, and fling the refuse on the shore.

### III.—TOTIPALMATÆ.

The birds of this family are remarkable for having the posterior toe united to the others in the same membrane which converts their feet into excellent paddles. They swim and fly well, and are the only birds among the palmipedes that perch on trees. First of the race is

The *Pelican* (*pelicanus onocrotalus*), plate 17, fig. 5, which has a very long, broad beak; the upper chap is hooked, and under the lower hangs a large pouch, which is capable of great distension. Larger than a swan, its plumage is a reddish-white; bill yellow, and remiges of the wings black. It is a native of the torrid zone. The tongue is very small; the whole race feeds on fish, of which they store away a large supply in the elastic pouch already described. The pelican has been represented as the emblem of maternal love, and it is believed that these birds open their breasts to nourish their young with their own blood. This is fabulous; the truth is, that they only disgorge the fish brought in their large pouches for their use. They make their nests of grass and reeds; these placed on the bare earth, contain two white eggs. Taken young, they become very tame.

The *Cormorant* (*pelicanus carbo*) is almost as large as a goose; dark brown below; above waved with greenish-black; head, neck, and thighs clothed with silky white feathers. These birds dwell among the northern seas of both hemispheres, and are very injurious to the fresh

water fish, found in the inland streams, which they often visit. Their favorite breeding-places are among rocks at the mouths of rivers. They lay four eggs. In early times they were trained to fish, and at present, in China, there is one species still used for that purpose. They have always, while fishing, a ring fastened around their throats to prevent them from devouring the fish. Brought to the stream where they are to be on duty, it is astonishing to see with what dexterity they follow and seize the prey, put it in their pouch, and without fail carry it to their master; for this they are rewarded with a few of the fish.

The *Frigate Birds* (tachypetes) and *Boobies* (sula) belong to this tribe, and also several others, as *Tropic Birds* (phæton) and the *Darters* (plotus.)

#### IV.—LAMELLIROSTRES, or the DUCK TRIBE.—(*Anas*.)

The palmipedes of this family have a thick beak, covered with a soft skin, rather than a true horn, and its edges are furnished with little teeth. The tongue is large and fleshy, and dentate on its edges. They live mostly on fresh waters. To these belong first

The *Swan* (*anas olor*), which is as large as a goose, snow-white, with a red bill and black feet; there is a black knob on the bill. It is one of the most beautiful specimens of the feathered race, and the ornament of its native lake. It does not, however, walk well, but nothing can be more graceful than its attitude while swimming; bending its long neck in the form of an S, and moving without the least apparent effort, its whole appearance is most majestic. It has no voice, no articulate cry; a slight hiss is the only expression it utters

when provoked. The water plants found at the bottom of ponds, with seeds and insects, form its food ; therefore it is useful in keeping down the superfluous vegetation. The wild swan is found in Northern Europe, but migrates to the south. The female makes her nest of grass and rushes, lines it with a few feathers, and lays eight eggs, of a greenish-white ; the male watches the nest with great care, and is ready to attack any intruder who may approach. The wings are so strong, that, it is said a single blow from one of them will break a man's arm or leg. The young swans are gray at first, and remain so until the third year, when they become white. Their flesh is considered good, their feathers highly valued for domestic purposes ; the wing and tail-quills are used for pens, and from the skin, prepared with its fine, beautiful down, many articles of female dress are made.

The *Singing Swan* (*anas cygnus*) is very much like the above described, differing only in having a longer neck, with the bill black, and without knobs. It is a native of the far north, seldom coming to Middle Europe ; builds its nest like the foregoing, and lays about seven yellow-brown eggs. Its voice, plaintive and musical, is never heard but once, and that is, the poets say, and many believe, when they are dying. The neck is perhaps less flexible than that of the *anas olor*. In New Holland there is a species of swan, which is altogether black, except the bill, which is bright red.

The *Common Goose* (*anas anser*) is known everywhere ; sometimes white, sometimes gray, with red bill and feet. Although geese live much in the water, they, nevertheless, require a dry housing ; different kinds of grain is given them for food. They are considered valuable stock, partly on account of their flesh, and partly

on account of their feathers, which their owners pluck many times in a year. The female goose, when two years old, lays twenty-four eggs, over which she broods carefully; the goslings are at first of a greenish-yellow. Geese have been reckoned silly creatures, but this is not so; they are prudent and watchful, become attached to their homes and keepers, and are very sociable among themselves, clustering in groups, and keeping up a perpetual cackling and screaming. Always wakeful, they give notice of the least alarm, and we are told in history how they saved the capitol of ancient Rome, by giving notice of the enemy's approach. Epicures value their livers highly, and are guilty of great cruelty in cramming the poor creatures with superfluous food, in order to enlarge the size of those viscera. The flesh of the old goose is very tough.

The *Wild* or *Snowgoose*, the common ancestor of the whole goose race, is gray-brown above, whitish below; lives in the north temperate portions of both hemispheres, migrates southward in the beginning of winter, flying in troops, going either in a line abreast or in a triangle. Their feathers are better than those of the tame goose, and the flesh of the young is very good. The ganders, or males, are distinguished from the female goose by having longer legs, and also by their loud cries when one of the flock is carried off, whereas the females remain silent.

The *Brazilian Duck* or *Black Diver* (*anas moschata*), larger than the common duck, is variously colored; black and red warts in the face; the male has a knob on the bill. It is a native of Brazil, lives on grains, water-plants, snails, etc.; is dumb, lazy, awkward, and glut-



tonous. The eggs and flesh of the young are good for eating; the old are valuable only for their feathers.

The *Common Ducks* (*anas boschas*) are descendants of the wild duck; their original color is a rusty brown on the back, grayish-white beneath, head and neck a changeable dark green, the wings are of the same, but shine with a metallic luster. The drake is distinguished by two large feathers in his tail which curl upward. The wild duck, found throughout the whole northern hemisphere, is shy and fearful, with the sense of hearing so acute, that it is a difficult matter to approach him, walks awkwardly, flies with great effort, but swims and dives with seeming ease. The voice of the drake is harsh and hoarse, that of the female clearer. Ducks eat all kinds of insects, grains, unripe seeds, etc., build a rude nest on the ground, mostly on the bank of a stream, in which they lay about sixteen eggs. The young are very pretty, covered with black and yellow down, swim excellently well at once, and seek their own food as soon as freed from the shell. Wild ducks are taken in various ways; one of the most singular methods of capturing them is the following: The sportsman places a pumpkin over his head, wades in the water up to his neck, and thus approaching the flock without alarming them, he catches them by the legs, and thrusts them into a bag which he carries. Ducks are very injurious to fish ponds, as they feed on the young fish. They are useful members of the poultry yard, as they lay a large number of eggs, and are also valued on account of the excellence of their flesh and feathers. As the females are very ready to forsake their nests, the eggs are mostly given to hens to be hatched; and it is interesting to see how, immediately the young brood take to the water where the hen can not

follow, in vain the anxious foster-mother runs clucking on the shore; the ducklings do not come back until they are ready once more to seek the warmth of the nest, a circumstance which is not without many precedents in the human economy.

The *Teals* (*anas crecca*) are brownish-gray on the back; the under portion of the body is white, waved with black; head and neck shining brown; throat black, and tail-feathers green; the length is thirteen inches. These birds belong to the north, but sometimes brood as far south as Germany, generally laying thirteen white eggs. They are lively and pretty, particularly the young, which, like mice, creep about in all corners. They utter a cry of *crick, crick, crick*.

The *Shoveler* (*anas clypeata*); head and neck are black on the upper half; the lower portion white; breast and under surface of the body chestnut-brown; back dark brown; wing-feathers, variegated with a white spot on the lower part of the belly. The bill is very large, remarkably broad at the end, and of a bluish-black color; the feet are orange-red. These birds inhabit the north temperate zone; make their nests in the reeds, and, in May, have from seven to fourteen yellowish colored eggs. They are not shy, but easily tamed, and soon become accustomed to the barnyard. Their flesh is well tasted; any one who takes the trouble of taming them is well repaid.

The *Eider Duck* or *Goose* (*anas mollissima*). Nearly as large as a goose, with the greater part of the body white; the head, belly, and tail are black; the forehead greenish; it has no luster. It is a native of the far north, and except in very hard winters, is never seen as far south as Germany. Their down is very valuable;

the best, however, is not that procured from the ducks which are shot, but that taken from the nests which these birds line with the beautiful covering of their own breasts. They are very abundant in Iceland, and are so kindly treated and cared for, that, rendered nearly tame, they suffer the natives to come to their nests and take away the down. They breed in rocks, and, in June lay five pale green eggs, which they cover carefully with down; these, the first of the brooding, are always taken away; the eggs are very palatable, and after the first three weeks are not disturbed. The eider duck feeds on crabs, snails, and fish; if shot, it dives to the bottom and holds fast to the sea grass, so that it is generally lost to the sportsman; the flesh is not good; in Iceland there is a law prohibiting their being killed.

The *Divers* or *Gooseanders* (*mergus merganser*) are as large as a common duck; black above, neck and under surface of the body white; head and tuft shining green; feet bright yellow, but after death become red. They dwell habitually in all the northern seas, and only visit temperate regions on the approach of winter. Their flight is like that of a duck, but they are expert divers, often remaining under the surface of the water two full minutes. They live on the shores of seas and rivers, and feed on the fish which they take in diving. The female builds a rude nest among the reeds, where she lays eight white eggs. The flesh is not good, but the skin is valuable, and brings a high price, being used as an article of dress. There are numerous varieties of this race, all closely resembling each other in appetites and habits.\*

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\* They are all found on this continent, and one species, the *Hooded Merganser* (*mergus cucullatus*) is peculiar to America.

## CLASS III.

## HERPETOLOGY.—REPTILES.

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THIS class is composed of two divisions, namely, those having warm red blood, and others, with cold red blood. The first-named (*Amphibia*) belong to the cold-blooded portion, and breathe the air through a respiration less perfect than those of the preceding classes which have warm blood; their lungs bearing little resemblance to those of the superior animals, operate with less facility and regularity, and the warmth of their bodies depends on the temperature of the surrounding medium. Most of them live alternately on land or in the water, and as their muscular vigor depends upon the warmth of the body, so does the changes of season and temperature powerfully influence all their functions, causing their motions to be slow and lethargic, active or vigorous. Their muscular action is not alone operated upon by the degrees of heat or cold, their sensations become obtuse, and their digestion slow. Acute as may be the senses of hearing and seeing in the warm season, lively and voracious as they then show themselves, in equal measure are they sluggish and indolent on the approach of winter, the greater part of which, in cold countries, they pass in a dormant state. Their tenacity of life exceeds all belief; tortoises are said to live many days, nay

weeks, after the brain has been removed. That the heart of a frog will pulsate for hours after being taken from the body, is a well known fact, and the muscles of the legs will expand or contract if strewn with salt, long after having been severed from the trunk of the animal. The skins of most of this class are either slimy or covered with scales; the tortoises, however, form an exception, being encased in a bony frame, which protects their bodies. With few exceptions, such as the snakes, which are vivaparous, the young of reptiles are produced from eggs; the parents, however, do not hatch them into life, as do the birds, but deposit them in the sand, or, like the frogs, in the water. The eggs of frogs being very transparent, the gradual development of the young reptile inclosed within is easily traced. Reptiles are arranged in four great natural divisions or orders, namely, *Tortoises*, *Lizards*, *Snakes*, and *Frogs*.

Tortoises are distinguished by the bony shield with which their bodies are enveloped, with the exception of the head and feet, which, left free, are covered with a flexible skin. The ribs, dorsal vertebræ, and sternum are united to the shell. Lizards have an elongated body, terminated by a tail, and provided, in most cases, with four extremities; their skins are covered with scales or plates, of greater or less size. Snakes are apodous, or without feet; their bodies, elongated and cylindrical, are covered with scales; these, being imbricate and flexible, they easily surmount any inequalities in their path. Endued with great muscular strength, serpents climb trees readily, and, possessing great agility, are extremely active in their movements. Amphibia of the frog kind are naked, with slimy skins, and have, when perfectly developed, four feet. They pass through several meta-

morphoses before their true organization is completed, first resembling fish, in that they live in the water, and respire through gills rather than lungs; after a certain period their form and structure are altered; the tail, gills, and covering of the head fall off, and an entire new creature, capable of breathing only in the air, is developed.

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## FIRST ORDER.

### TORTOISES.—CHELONIA.

#### I.—LAND TORTOISES.—(*Testudo.*)

The *carapax*, or upper shell, is concave, and fastened at the sides to the *plastrum*, or lower shield; the feet are stumpy, the toes short, and the four extremities, as well as the head, can be withdrawn entirely inside of the shell.

The *Greek Tortoise* (*testudo græca*), plate 18, fig. 1, is oval shaped, with the shell highly vaulted; about nine inches in length, and weighing four pounds; the plates of the shell are black, bordered with yellow. This tortoise is very common in the south of Europe, and also in America. Living on weeds, insects, snails, slugs, etc., it is a welcome resident in gardens. It can be tamed, and is then fed with salad, meal, potatoes, and other vegetables. It is capable of living a year without food. The flesh is sometimes used for table diet, and is said to make a palatable soup.

The *Geometrical Tortoise* (*testudo geometrica*), plate



18, fig. 2, is the smallest of the race, and very round; its shell is much vaulted, and handsomely marked; the groundwork is black; on the top is an angular plate of yellow, from which radiate a number of starlike rays. It is a native of the Cape of Good Hope.

The *Red-Brown Tortoise* (*testudo brunnea*), plate 18, fig. 4, much resembles the foregoing, except that the carapax is more depressed, and of a yellow color, marked with brown. The point of the tail is furnished with a horn-like appendage, which serves as a sting. It is found in Pennsylvania.

The *Rough Tortoise Forked* (*testudo furcata*), plate 18, fig. 5, is a very small, neatly formed land tortoise, with a greenish-brown shell, with flat yellow plates on the sides; but the middle is elevated and ornamented with a brilliant yellow star, from which radiate rays of black. It is a native of the East Indies.

The *Indian Tortoise* (*testudo elephantina*) is oval-shaped, the carapax much arched, and in length from three to four feet; the lower portion of the legs long and brown. It is brought occasionally from the East Indies to Europe, and is so large and strong that it can carry men on its back. Little is known of its habits.

## II.—POND OR SWAMP TORTOISES.—(*Emys*.)

These amphibia have longer nails, the toes are distinct, and, provided with webs between them, are fitted for swimming. The first is

The *European Swamp Tortoise* (*emys europæa*). The shell is rather flat and softer than those of the above family; the color black, spotted with small yellow points. It is found in all the marshes and ponds of Hungary,

East Germany, etc., and feeds on worms, insects, and fish. Lays its eggs in moist earth. These, although at first white and transparent, gradually become red, and at last black. Remains torpid during the winter. It can seize large-sized fishes, and thrusting its strong teeth into the lower portion of the body, holds its victim fast until it ceases to struggle, and then proceeds to devour it, which it does so effectually as to leave nothing but the back bone. This species is also eaten.

### III.—FAMILY OF SEA TORTOISES. (*Chelonia*.)

The carapax of this species is too small to enclose, entirely, the whole of the head and feet. The anterior extremities, very large and fin-like, are only suited for swimming. The mouth bears much resemblance to a strong bill. The first of this family is

The *Giant Turtle* (*Chelonia midas*), which is from six to seven feet in length, and weighs eight centners. The carapax is smooth, strong, and spotted with brown. This species, famed for the excellent quality of the flesh, is found in all the southern seas, dwelling principally on the coasts overgrown with sea weed, or other algæ, on which they chiefly feed. They are not carnivorous, but altogether herbaceous, live in companies, and are very peaceful. When the time for laying eggs arrives, they choose a spot on the sandy beach of some inlet, where, at night, they excavate a cylindrical hole beyond high water mark. How this is accomplished is not clearly known. In this they deposit their eggs, amounting to one hundred. These, about the size of a billiard ball and covered with a white tough skin resembling leather, they place in regular rows, and cover them with sand,

which they level off so carefully as scarcely to leave a trace of their labor. This operation over they return immediately to the sea. The eggs are considered excellent food. The yolk, however, which is boiled hard, is the only part eaten, the white, remaining slimy, is never used. The time for taking the sea tortoise is just when the troop leaves the water for the shore; the enemy then approaches quietly, and throws them on their backs by means of an iron crowbar. In this position they are helpless; nevertheless, as they strike out fiercely with their fore feet, great care is requisite to avoid receiving a blow, for such is the force of a stroke, that it may overturn a man or break a limb. Nor is it safe to advance too near, for they bite severely. The flesh is highly esteemed; the fat is of a green color.

The *Hawksbill Turtle* or *Carette* (*chelonias imbricata*), is two feet in length, and distinguished by the arrangement of the horny plates of its carapax, which extend one over the other like the tiles or shingles of a roof. Their color is yellowish, marbled with brown. Their habits are like those already described. The eggs are said to be good food, but the flesh, occasioning sickness, is unfit for eating. The shells, however, are valuable, and in order to detach the plates, it is only necessary to expose the carapax before burning coals. They are then softened, by being dipped into boiling water, and afterwards, placed in layers, between metal plates, can be made of more or less thickness, and soldered or molded into any required shape.

## THIRD ORDER.

## SAURIA, OR LIZARD-LIKE AMPHIBIA.

The order of Sauria comprises all reptiles resembling lizards in their general conformation, whether the size is small or great. All are distinguished by their great activity in the warm season. All possess sharp teeth, more or less developed, and all live by rapine. The tail is large and strong, and, in some of the species used as a weapon for striking their prey.

## I.—THE CROCODILE

Is distinguished by its large size. The whole body is covered with scales. There are five toes on the fore feet; four on the hinder. The tongue is fastened to the lower jaw; the mouth so wide that, on being opened, the upper jaw has the appearance of being movable. Their eggs are as large as those of a goose, and the female provides for her young after they come forth. They live in fresh waters, mostly at the mouths of rivers, and, as they can not swallow in the water, it is said they drag their prey there to drown it. This done, they deposit it in some hole to putrefy before they eat it, which they do at their leisure. To this genus belong also

The *Gavials* (*Iacerta gangetica*), which are thirty feet long, with slender, beak-shaped muzzles, and many rows or ridges of scales on the back. They inhabit the banks of the Ganges in large numbers, and live mostly on fish, and are by no means dangerous, although they sometimes seize the swimmer who approaches too near their neighborhood; this they do with much boldness and dex-







terity. The Hindoos regard them as sacred, and will not suffer them to be killed.

The *Crocodile of the Nile* (*Iacerta crocodilus*) has an oblong, depressed muzzle and unequal teeth; is eight or twelve feet in length, and, like the gavial, has many rows of knob-like scales on the back. Crocodiles of this genus sometimes attain a length of thirty feet; they are the most celebrated of the species, and were well known to the ancients, who described them. They were considered sacred by the ancient Egyptians, who tamed and honored them, adorned them with jewels while they lived, and embalmed their bodies after death. They remain in the water during the night, but spend the most of the day on the shore, where they deposit their eggs in the warm sand. The eyes are very small like those of the hog, and as they see better when their heads are above the water, generally float on the surface. The earlier naturalists have said much of the friendship which subsists between crocodiles and birds; this is easily accounted for as ants are a great scourge to these formidable animals; introducing themselves into their mouths in great numbers the moment they go on shore, they torment them with their stings; ants are the legitimate prey of little birds, therefore they enter these great mouths without fear, in pursuit of these insects, and thus become their deliverers. This assertion, long considered fabulous, is, nevertheless, true; for, a species of plover, in Egypt, or the tody in the West Indies, are always seen in flocks hovering round the crocodiles, although, it is also said, that those river monsters can clear their mouths of their stinging little foes with the toes of their hind feet. The ichneumon is, however, their most formidable enemy, pursuing them eagerly.

The story of the crocodile shedding tears and uttering cries of distress, in order to allure victims, is altogether fabulous. The manner of capturing them is by means of large hooks, fastened to a strong line, and baited with meat; this being swallowed, the creature, altogether in the power of the enemy, is killed by being pierced with lances in the tenderest parts.

The *Caiman* or *Alligator* (*crocodilus sclerops*), plate 18, fig. 6, found everywhere in South America, is twelve feet in length, has a ridge, which unites the projecting orbits of the eyes in front. Its color is a grayish-yellow, with black stripes and rings; it spends most of its time in the water, coming forth at midday to the shore, in order to sleep in the sun. It only attacks men when found in the neighborhood of its eggs, which, resembling those of the turtle, have a leather-like covering, and are good to eat. Its white, but coarse-grained flesh, tastes like that of the frog. The caiman, with all others of the crocodile race, is almost bullet-proof; for, if the shot does not strike the throat or under surface of the body, it glances off harmlessly. If the creature is hungry, he remains in the water, burying himself in the mud or sedges near the shore, and when the victim approaches, seizes it with a spring, drags it into the water, dives under the surface to drown it, and then depositing it in some cleft or hole on the shore, devours it at leisure. The caiman is taken by baited hooks, the same as the above described.

## II.—THE LACERTIAN or LIZARD FAMILY.

The genuine lizards are distinguished by their thin, two-threaded, extensile tongues; have five toes, armed

with nails, on all their feet; the hinder ones are unequal. The first of this genus is

The *Monitor of the Nile* (*lacerta nilotica*), which is five feet long, about the size of a man's thigh in thickness, and covered with large eye-shaped spots and streaks; the color is brown, the scales small and rectangular. It is a native of Egypt, and very rapacious, seizes all small animals which come within its reach, sparing not even the eggs and young of the crocodile. When irritated, it hisses like a serpent, lashes with its tail, and bites severely.

The *Land Monitor* or *Sauvegarde* (*lacerta ameiva*) has smooth scales, is one and a half feet in length, green on the back, blue below, and striped on the sides with yellow and black. Found in South America, it lives in the clefts of rocks or under brambles, etc., and feeds on all kinds of small prey. Very shy and timid, it flies from the crocodile with a loud, whistling cry, from which it has received its name of monitor. There is a larger species, which is black, and said to be palatable eating.

The *Common Lizard* (*lacerta agilis*) is nine inches long, coppery brown on the back, the sides green; the male is lighter colored, and his scales shine with metallic luster. This lizard is found almost everywhere, abounds in stone heaps, old walls, and ruins, where it feeds on insects of all kinds, worms, snails, etc. In the spring it lays six white eggs, about as large as hazelnuts, and covered with a skin resembling parchment; these firmly placed in the earth, are not hatched until autumn. All reptiles of the saurian race pass the winter in a dormant state, remaining in deep holes during their sleeping season. They will become very familiar, but when taken, they must not be held by the tail, as it is easily

broken off; nevertheless, it grows again, but is imperfect.

The *Green Lizard* (*lacerta viridis*) is as large again as the foregoing, and of a brilliant lustrous green color, enameled with black spots; is rare in Middle Europe, but abounds in all warm countries. It exceeds all others of the species in agility, and is more easily tamed.

### III.—THE IGUANA FAMILY.

The saurians of this race resemble the *lacertæ* in their conformation; their tongues, however, are fleshy, thick, not extensile, and slightly notched at the end. The first is

The *Stellios* (*lacerta stellio*), which is one foot in length, has a large head like a toad; the body is olive-green, marked with black. They are ugly creatures, and common throughout the east, living in ruins, old walls, clefts of rocks, etc. The Mussulmans hate and kill them whenever they come in their way, because, they say, these lizards nod their heads in mockery of the Mohammedans as they pray.

The *Flying Dragon* (*draco volans*), plate 19, fig. 6, is nearly one foot long, the body green; the wings, which are singularly sustained by the ribs, and not moveable, brown, and the scales are very small. It is found in the East Indies, especially in Java, and, being a very harmless creature, does not deserve its frightful name. It rather leaps than flies, using the wings rather as a parachute to sustain it as it springs from branch to branch.

The *Iguanas* (*iguana delicatissima*), plate 18, fig. 7, are from three to four feet in length; the upper surface

of the body is olive, marbled with green, lighter beneath, the tail ringed with black, the back furnished with a row of sharp prickles. The male has a pouch on his throat, and the mouth is well provided with sharp teeth. This lizard is much valued on account of its flesh, being considered as the greatest delicacy in South America, which is its home. It lives mostly in trees, feeding on insects and fruits. When resting, they bury themselves among the leaves, and being nearly of the same color, are not easily discovered. They are, however, simple, harmless creatures, and easily shot. One method of taking them is, to fasten the foreleg to the back; thus they can not run away, and are captured living and unhurt. The flesh of the female is preferred, on account of the eggs contained. They can dilate or contract the pupil of their eyes, as do cats.

The *Basilisks* (*Iacerta basilicus*), plate 19, fig. 5, have a crest or comb on the head, which extends along the back to the tail; it is elevated and supported by the spinous processes of the vertebræ. They are found in South America, and, like the iguana, live in trees, and subsist on fruits and insects. Their length is about three feet, of a bluish color, with two white bands on the back of the head.

#### IV.—THE GECHOS

Are remarkable for their squat, flattened form; short feet and toes, which, nearly of equal length, are widened in front, and armed with sharp retractile claws, and furnished with a fold of skin below, enable them to walk with ease on smooth walls and ceilings. Their eyes are large and cat-like; loving darkness, they conceal them-

selves by day, coming forth only at night in search of prey—crawling rather than walking.

The *Spotted Gecko* (geko guttatus) is one foot in length, of a sea-green color, with granular scales spotted with reddish-brown; the head is like that of a toad. They are ugly reptiles, live in the torrid zone of both continents, and utter a most disagreeable cry of *toknie*, which, heard in the twilight, sounds like a boding of evil. The teeth are so sharp as to impress iron, and they are charged with being venomous, but modern naturalists deny this assertion. There is a smaller species of gecko found in Italy which is five inches in length, and tolerated in houses because it rids them of insects; its bite, however, is also said to be poisonous.

#### V.—THE CAMELEONS.

The *Camelion* (chameleon africanus) forms a separate family, plate 19, fig. 4. The skin consists of a number of scaly granulations placed on a smooth ground; the body is contracted and bent, the tail round and prehensile; on each foot are five toes, three directed in front, and two backwards. The eyes are very large, staring, and projecting, moving altogether independently of each other; the tongue is fleshy and cylindrical, glutinous, and very extensile. The lungs are so large that their inflation, it is said, causes that remarkable transparency, and the consequent changes of color for which the chameleon has been celebrated in ancient as well as modern times. They are about one foot in length, with a triangular shaped head, and grayish colored body. Found abundantly in Egypt, where they live in trees, remaining motionless the most of the day. They use their long



tongues like those of the woodpeckers, and are quite as expert in striking down flies, insects, and other winged prey. They have no note or cry, but only utter a gentle hiss when seized upon. They can be tamed, and having been observed by naturalists to live a twelvemonth without food, have given rise to the belief that the chameleon subsists on air. The chameleon sleeps in holes in the earth during the winter; the eggs are covered with a parchment-like skin. That it possesses the faculty of changing its color, is true; and these changes are more particularly observed when the animal is excited either by anger or atmospheric influence. Sometimes it is green, then red, and afterwards bluish, and, it is said that when particularly irritated, it turns altogether black. Commonly, however, it takes its hue from its surroundings, in this resembling, or rather serving as an emblem, of many men whose moral characters are similarly influenced. The fresh air is indispensable to its existence; it inhales it greedily, and receives at once a brighter hue. In sickness it turns yellow. The manner in which chameleons catch their prey is the following: they march from branch to branch, suspend themselves by their prehensile tails, and if an unlucky fly or straying beetle comes near, it is stricken down with their tongues and swallowed living; their bodies being transparent, the struggles of the victim inclosed is apparent. Changing color with whatever surrounds them, they are not easily found; but whence they derive this singular power, or by what faculty they effect these changes of color, has not yet been clearly understood. When they wish to leave a tree quickly they inflate their bodies with air, and suffer themselves to drop to the earth.

## VI.—FAMILY OF SCINCOIDEA.

The feet of this genus are very short, their bodies so much elongated and pointed that the tail is hardly distinguishable as a separate member. They are covered with oval-shaped, imbricated scales, and more resemble serpents than lizards.

The *Common Scinque* (*scincus officinalis*) is a span long; about as thick as a man's thumb; of a silvery-yellow hue; striped transversely with black. These lizards abound in north Africa and Arabia; are lively creatures; notwithstanding their singularly clumsy appearance, they move very quickly, and when pursued glide swiftly over the sand or under the roots of bushes. In the early times medicinal powers were ascribed to this race, and they were much sought after, as they brought a good price when sold to the apothecaries.

The *Eel Worms* (*lacerta chalcides*) are about one foot in length, and resemble the common blind worm; their scales are so smooth and shining that they look as if they were saturated with oil. Their legs are too short to serve them in walking, therefore they crawl like the snakes. Like the blind worm, their homes are in damp meadows and wooded plains, where there are insects and snails to be found, on which they feed. They abound on the shores of the Mediterranean, and on the approach of winter retire to holes, where they remain in a dormant state.

## THIRD ORDER.

## OPHIDIANS OR SERPENTS.

Serpents are entirely without feet; their bodies cylindrical and greatly elongated; the interior structure closely resembles the exterior; the internal organs are few and also extended. Although they have teeth, and, many of them, fangs which are venomous, they never use them for separating or masticating their food; they swallow their prey whole, only seizing it with their teeth. Their forked tongues, always in motion, aid them in discerning the nature of the earth over which they crawl, for their eyes are too close to the ground to note its inequalities or otherwise.

The serpents are divided into three families. The first is that of the snakes or angues, which have the rudiments of extremities under the skin.

I.—THE COMMON SNAKE (*anguis fragilis*),

Is about one foot in length, and not thicker than one's little finger; of a handsome copper-brown above; its scales shine with a metallic luster; there are three dark brown stripes on the back; the under surface is blackish. It is found in Europe and America; the teeth are small and crooked, and the tail is so brittle, that, like that of the lizard, it will break if rudely seized; its food consists of worms and insects. On the whole it is a harmless reptile, which there is no occasion to fear, as it never bites, except when provoked. Snakes sometimes lay eggs, and sometimes bring forth their young living, mostly twelve in number, which are bronze colored

above, smooth, shining, and blackish beneath. They are dormant in winter.

The *Glass Snake* (*anguis ventralis*) is olive green, spotted with black above; yellow underneath; about two feet in length, and abound in the woods of North America. They have the power of stiffening themselves so as to break in two on receiving the lightest stroke; from this brittleness they derive their name. Their food and manner of life is the same with the foregoing.

## II.—THE TRUE SERPENTS (*Serpentia*),

Possess no internal traces of anterior extremities; some, however, have, beneath the skin, rudiments of posterior extremities which sometimes show themselves externally, in the form of a small hook.

The *Belted Serpent* (*amphisbæna alba*) is as thick as a man's finger, and about two feet in length. Its color is white, and instead of tapering off towards the tail, maintains an equal thickness throughout its whole longitude. This, together with the faculty it has of moving equally well backward and forward, has given rise to the popular belief of their having two heads; their motion is slow, and they see badly. They are oviparous; found in South America in numbers; live principally on worms and ants, and with a relative species, which are of a copper color (*amphisbæna fuliginosa*) make their abode in the decayed hearts of trees.

The *Giant Snakes* (*boa constrictor*), plate 19, fig. 3. These enormous reptiles are twenty feet long; the head is covered with small scales. This genus is easily recognized by a sort of chain running along the back, and formed of hexagonal black spots; on the sides are oval

scales of a yellowish color. The boa dwells in America, is found in forests and clefts of rocks ; climbs the tallest trees, and suspending itself by the tail, waits quietly for prey, which it surrounds in its folds, and presses so strongly that the body is soon crushed into an oblong form, so as to be more easily swallowed. After thus kneading the victim, it bathes it in slaver, and dilating its enormous jaws, begins the task of swallowing. For this process, which, it is asserted, requires several days to complete, the mouth and throat are distended to an almost incredible size ; the peculiar arrangement of the lower jaw permitting such an enlargement, as the maxillary branches, instead of being united by a bony substance, are bound by a tough, but elastic skin. It is said that the body thus distended retains the shape of the animal swallowed for some time. After a repast of this kind, the serpent remains quiet during the process of digestion, and while in this obtuse and motionless state, is easily killed. The boa never attacks men unless provoked, and if aroused to anger, will send forth, often for the length of a day, a hissing sound like the noise of steam escaping from the safety-valve of a boat or machine. The tongue, like those of all the ophidia, is forked and always in motion. The most effectual means of killing this dangerous reptile is by shooting, using large shot.

The *Water Snake* (boa murina) is brown, with two rows of black spots on the back. It inhabits the rivers and lakes of South America, and is forty feet in length. Concealed under the broad leaves of the water plants near the shore, this huge serpent lies in wait for such animals as come to drink. It feeds also on fish ; and although so seemingly formidable, is cowardly, and flees from man. A traveler relates the following adventure :

“Sailing up one of the rivers in Surinam, I saw a huge lump of something lying in the mud, which I at once determined to examine. The negroes who manned the boat entreated me not to meddle with the muddy mass, for it was a serpent. I insisted it must be either sick or dead, it lay so motionless, and accordingly, gave it a blow with the rudder. This caused the creature to raise its head a little, after which it again settled down as quietly as before. I next fired a shot at its head; the ball struck, wounded, but did not kill, and now, completely awake, the creature raised itself straight up as if in the act to throw its huge body on the boat, which would doubtless have proved our destruction. But at this critical moment our expert helmsman turned the boat’s course, one of the crew kept him at parry with an oar, and a third, aiming a blow at his head, struck it so skillfully with his pole, that it fell back dead into the water. On being cut up, it was found to contain seventy-eight young ones, yielded a considerable quantity of fat, and the negroes feasted on the flesh.”

The Indians and negroes frequently eat the flesh of serpents, always cutting off the head and tail as soon as the creature is killed; this is done from some superstitious belief, the ground of which is not known. There are many large serpents in America resembling this species of boa, and scarcely differing in their habits, are worshiped by the savages, who represent them as having wings, and thus being very injurious, but say they have never been known to seize on mammalia or prey upon the human race.

The *Rice Snake* (*boa javanica*) is one of the handsomest of the boa species belonging to the Old World; furnished with hooks at the posterior portion of the body,



it attains a length of twenty feet ; is of a bluish-gray color, dappled with spots of white and brown, the latter of which varies in the light to a brilliant purple, like the luster of the amethyst. Natives of the East Indies, they abound in the hills of Java, but are also found in the low-lying grounds and rice-fields, where they are not so large. They feed on mice, birds, the cubs of the lion and tiger, and will also seize young elephants ; and being very dangerous to the cattle, they are on that account hunted with great zeal. To accomplish this, a time is chosen when the serpent, full to repletion, is reposing after having swallowed his prey. Rendered helpless during the digestive process, he is easily killed, either by blows of clubs or shot with poisoned arrows. Taken young, the boa can be tamed, and it has often been brought to Europe. In this state it is fed on rabbits, although it can subsist without eating for many months. The eggs are about as large as those of a hen, and have a shell resembling parchment. There is a race in Africa which much resembles the *boa javanica*.

The *Black* or *Ringed Snake* (*coluber natrix*) is from two to four feet long ; gray-brown above, dark gray below, spotted with black and white ; abounds in many countries in Europe, and always chooses the neighborhood of swamps for an abode. The old-fashioned belief that it lived in houses or cellars, and drank the contents of the milk pans, is not true ; but being fond of warmth, it creeps into beds whenever it can. It is not venomous, and so timid that it flies on the approach of man. Its presence is tolerated in cellars where vegetables are kept, because it destroys the mice, and is often tamed. Frogs are its favorite food.

The *Yellow Adder* (*coluber flavescens*) is about five

feet in length, grayish-yellow above, lighter-hued below, four feet long, and abounds in the mountains on the Rhine, where they climb trees readily. The celebrated snake-baths (Schlangenbad) receive their name from these reptiles. Much resembling this species is

The *Esculapian* (coluber æsculapii), which, four feet long, of a lustrous brown color above, sulphur color below, inhabits Italy, Greece, and Egypt, is naturally fierce, and bites without provocation; nevertheless it can be tamed. The ancient Greeks regarded it as the emblem of health; therefore Æsculapius is represented as having a serpent twined round his staff.

The *Spotted Snake* (coluber austriacus). Over two feet in length, red-brown with dark brown spots, under part of the body white and spotted; the back of the neck is marked with a brown heart. It is found in the mountains of Thuringia, Austria, and Bavaria, and bites severely when captured. It feeds on lizards, which, like the boa, it crushes before eating.

### III.—VENOMOUS SERPENTS.

All of this genus are provided with a pair of gland teeth, which are hollow and suffer the saliva to pass. This saliva is poisonous. The head is disproportionately broad, and gives them a frightful appearance. Many of them are not oviparous, but bring forth living young. All venomous serpents are sluggish, and unless frightened or provoked, will never attack men. Most formidable of the race, and standing at the head of the family, is

The *Rattlesnake* (crotalus darissus), plate 19, fig. 1, which owes its name to a singular apparatus, consisting

of a number of horn-like rings situated at the end of the tail, and fitting loosely, make a noise like the rattling of dry peas, when the creature moves its tail. There are many species. The specimen in plate 19, fig. 1, represents the first class of crotalii; six feet long; brown above, with irregular bands of black; the under surface is pale yellow, spotted with black. These reptiles inhabit the temperate and warm countries of America; are sluggish and inactive, keeping under rocks and old trees, or holes in the earth, where they pass the winter in a benumbed state. They are celebrated for the violence of their poison, for if their fangs strike into a vein, the one bitten dies instantly; nor do they wait to be provoked before inflicting their deadly stroke. When alarmed, the snake coils its body into a circle, shakes its rattle, and erects its head, with flaming eyes; it is then high time to fly; but it must be done as quietly as possible. The wound at first is not more painful than that caused by the scratch of a briar, but weakness, languor, distressing thirst, and difficulty of breathing ensue; the limb swells, and soon after death comes and relieves the sufferer. If the circulation is at once stopped by a bandage above the wounded part, the poison sucked out, and remedies promptly used, the patient may be saved; but even in such a case remains sickly, and never recovers the hue of health. It is well these dangerous reptiles are so helpless and vulnerable; a stroke from a riding switch will kill them. They are believed to possess the power of charming their prey by gazing at it, until it is incapable of flight; many are doubtful of this fact, nevertheless it may be true. Hogs can not be injured by their bite, as a thick layer of fat between the skin and flesh forms a complete safeguard, and when driven into the

forests to feed on mast, if they meet with these reptiles they devour them with impunity. It is also a popular belief that rattlesnakes are never found in places where ash trees grow. The flesh is eaten by many, and, confined in strong wire cages, they are occasionally taken to Europe. When the outer cover of their prison is removed, they rattle. By this singular appendage the age of the reptile may be ascertained, as naturalists say that an additional bone or rattle is acquired every year. They are also found in South America, where, with other venomous serpents, they are very numerous among the bamboo reeds.

The *Cross Adder*, or *Viper* (*vipera berus*), is two feet in length, on the back is a zig-zag line of black, and between the eyes are three small plates. There is upon the head a singular mark, not unlike a cross, from which their name is derived. The females are of a lighter brown, and are often called copperheads. This venomous race is found in all the mountain forests of Europe; they are, however, not numerous. Their bite causes vertigo and nausea; their venom is not sufficiently deadly to destroy life if remedies are promptly used. The circulation must be at once stopped, by a bandage; the wound must be washed with ley or aqua ammonia, to prevent the poison from spreading; and, last of all, cauterized. This last named expedient is peculiarly necessary in very hot weather, as the venom then operates with surprising rapidity. The adder loves to bask in the sunshine, and lives on mice, worms, insects, and small birds. If a mouse strays into the neighborhood of these snakes, they dart upon it, give it a bite, and let it go, watching it closely. If it remains motionless, they crawl leisurely towards the victim, and swallow it whole. They do not

bite unless provoked, and can not injure through the leather of a boot. Like all others of the serpent race, they pass the winter in a torpid state. In catching them it is necessary to take them by the tail, as they, in this position, are unable to turn and bite the hand that holds them. There is also species of viper which is black.

The *Common Viper* (*vipera aspic*), plate 19, fig. 7, is much like the foregoing, is three feet in length, and instead of plates, has scales on the head. It is found in the south of Europe, and its poison spreads more rapidly than that of the adder.

The *Horned Viper* (*vipera cerastes*) is about two feet long; grayish-yellow, with darker spots. The *Cerastes* are distinguished by having a small horn over each eye. Are found in the desert plains of Africa and Arabia, where they crawl through the sand with incredible swiftness. The *cerastes* were well known in ancient times, and are often seen sculptured on obelisks, etc. Their horns are movable, and about two lines in length.

The *Spectacle Snake* (*cobra capella*—*coluber naja*), plate 19, fig. 2. Brownish-yellow above; white below, with a reddish-brown line, in form like a pair of spectacles, on the extensible part of its neck. Is one of the handsomest but most dangerous serpents of the East Indies, where it lives in holes or caverns. It is taught to execute certain movements with its head, in time to music, by the Indian jugglers. This they call dancing, and exhibit to the public. They are tamed in the following manner: First, after being taken, they are put into a deep earthen jar, and then, irritated by having a stick thrust in among them, they protrude their heads, expand their necks, and show their fangs. At this moment the keeper gives them a blow on the nose; the snake retreats,

is again driven forth, and these movements continued until the creature is completely exhausted. During this process, pieces of woollen cloth are given to it to bite. Thus the greater portion of the venom is extracted before the fangs are removed. The juggler then plays on some wind instrument, and instructs them to keep time to the music. The bite of the cobra is nearly as dangerous as that of the rattlesnake. They are revered as sacred by the Brahmins. The plant called snakeroot is considered an antidote to their poison.

The *Asp of Egypt* (coluber haje) is greenish, with short stripes of brown; about two feet long, and without spectacles. Like the cobra it expands the neck when angry, and is also taught to move to the sound of music. The jugglers press it with the fingers on the back of the neck. This causes it to fall into a kind of catalepsy, which renders it stiff and immovable. Many say that this was done by Moses when he put Pharaoh's jugglers to shame. It is unquestionably the asp of Cleopatra. The jugglers remove their fangs to lessen the danger of their companionship, but they soon grow again. The *Cæcilia*, blind or wrinkled snakes, mark the transition of the Ophidean race to the Amphibeian. The wrinkled snake has a soft, naked, slimy body, composed of rings. The eyes are so small as to be scarcely discernible. Are natives of the south, namely, Surinam, Brazil, Ceylon, etc., where, like the rain worms, they live in the mud. They are not at all venomous.



## FOURTH ORDER.

BATRACHIA, OR AMPHIBIA OF THE  
FROG KIND.

This race of reptiles is distinguished by having neither scales nor shell, but are covered with a slimy skin. Their toes are without nails. The eggs are soft, at first gelatinous, like the spawn of fish, but afterwards clothed with a tough skin. The young breathe through gills, as fish, instead of lungs; have a tail also fish-like, which, after a time, falls off, and at length the extremities are developed gradually.

I.—FROGS.—(*Rana*.)

Attained to their perfect state, frogs have no tails. They, however, possess four feet, the hinder ones being very long, which enables them to swim and leap well. Their heads are flat and broad; their mouths round and deeply cleft; the tongue is extremely long, and formed in such a manner that the frog swallows the point down its throat, so that it can be drawn out, like a sword, and is of the greatest use in catching their prey. Respiration is accomplished by the air being pumped into the lungs by the muscles of the throat; therefore it is, as may have been observed, that their throats are perpetually in motion. Their eggs are like the spawn of fish, and at first a gelatinous mass; in a few days they enlarge, and the rudiments of the tadpole, a little round bullet, may be distinctly traced. It subsists on the liquor in which it is circumfused, but in a short time afterwards the gills are formed; next it has motion and swims about like a fish.

Ere long the gills disappear, and after a retransformation, give place to lungs. A distinct head, with its large eyes, is now plainly discernible, the tail assumes the form of that of a fish, and the little creature swims lustily round, and lives on the sap of the water-lilies. In a few months the extremities appear—first the hind feet, then the fore—which slowly and gradually protrude from the body. These perfected, the tail shrivels and falls off, and the frog is completed, although not fully grown. To this order belongs, first,

The *Green Frog* (*rana esculenta*), which is green, spotted with black; the under part of the body white and about three inches long; inhabits the ponds throughout Europe. Its eyes are lustrous, and shine like gold; the hind feet are palmate; the male have on each side of the neck, between the ears, a thin membrane which becomes inflated when they croak. The females are silent. The note of the frog, harsh and discordant, is familiar to all, and, heard in the warm summer evenings, sounds like *bre-ke-nek—ro-ah ro-ak*; their food consists of insects, snails, and worms. They ordinarily keep on the banks of ponds and rivulets; their spawn, which they deposit in June, sinks to the bottom. In winter frogs bury themselves in the mud, and do not eat. The hind quarters are considered a delicacy in France, and also wholesome food.

The *Meadow Frog* (*rana temporaria*), smaller than the above-named, is of a yellow-brown color, spotted with black; found in gardens and grain-fields, where it may be seen in harvest hopping around alone. Its spawn does not sink to the bottom, but swims on the surface of the water; insects and worms constitute its food, and it is most dexterous in catching its winged prey. On see-

ing some poor fly or unwary beetle approach, it remains altogether motionless, but after a time makes a sudden spring, and never fails to seize the insect, although at a distance of half a foot. Should the captive be a wasp, it is at once rejected; frogs are used as bait in catching crabs, which are taken from them and put into ponds; their croak is not so loud as that of the above-named.

The *Bull Frog* (*rana mugiens*) lives in the warm regions of North and South America, and, the largest of the frog race, is eight inches long, and four in girth; greenish-brown on the back, with darker spots; the under surface is yellowish-white. Their tones resemble the bellowings of oxen, and it is said that a company of soldiers were once so alarmed by the fearful noise made by a troop of bull-frogs, that they took to flight, supposing an enemy, lying in ambush, was near.

The *Tree Frog* (*hyla arborea*) measures one and a half inches; of a beautiful green color above, whitish below; the male has a black throat. This race differs considerably from other frogs in the conformation of their feet, having, at the extremity of each toe, a sort of viscous pellet or ball, that enables them to adhere to the bodies on which they climb, and instead of two bellows on the throat, there is only one. The tree frog, with few exceptions, deposits its spawn in the trees where it dwells, during the summer; its croak is louder than that of any other of the race, and as this note is always heard before rain, it is often kept in a glass vessel, and fed with insects, by farmers and others, who esteem it a sure weather prophet. Towards the end of May it loses its green color, and becomes gray, spotted with brown; this, in its turn, changes to various hues, until, at last, it resumes its primitive green. It is silent until the

fourth year, watches for flies like a cat for mice, and springing on the victims, secures them with the same dexterity.

The *Crackle Frog* (*Hyla crepitans*), one and a half inches in length, is of a foul white above, red-brown below. It lives in Brazil in trees, and utters a note which sounds like the crackling of dry brushwood when being broken.

## II.—THE TOADS (*Bufo Cinereus*),

Are as large as a man's fist; red-brown above, gray below, and skin covered with ugly warts. It lives under shady plants, prefers damp, dark places, and goes forth in the evening in search of worms, snails, insects, etc. When pursued, they act upon the defensive, and if seized, inflate their body so as to render it hard and elastic; this causes the skin to exude a white, acrid humor, which, although not venomous, occasions very unpleasant sensations. The note of the toad is something between a howl and grunt. It has been said that toads will suck cows; this, however, is not true. Their tenacity of life is almost incredible; they are often found alive in stones where they must have been enclosed for a length of time.\* The supposition is, that during their winter's sleep they were overwhelmed by a shower of sand which became petrified; but although, on being taken out, they so far revived as to hop away, they soon after died, not being able to bear the pressure of the air.

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\* Many naturalists say this opinion is inadmissible, and believe that in such cases the retreat of the toad communicates externally by some hole which was accidentally closed or had escaped observation.—*Tr.*

The *Reed Toads* (*bufo calamites*) resemble the former, but are smaller, olive-gray, with brown-red warts, which contain an offensive fluid, and sending forth their croakings from among the canes or reeds where they harbor in the spring time, they receive their name. Storks will not eat this species on account of their offensive odor.

The *Glitter Toad* (*rana bombina*) is dark brown above with small warts, smooth below, bright yellow, marbled with blue; about as large as a tree frog. This species is very numerous, and as they scream forth their discordant notes of *unk*, *unk*-day and night, are called the *Unks*. They stretch their heads out of the water, as if looking round in search of something, but the moment any one approaches, they dive under. They are found in all pools, where they feed on insects.

The *Pipa* (*bufo pipa*) is only half as large as the common toad, and of a brown color; the back is covered with a multitude of cells, which are the receptacles for the creature's eggs; these, first deposited in the ground, are collected by the male, placed on the female's back, pressed within the cellules, which close upon them, and thus the young pipas gradually develope, and are seen in various stages of maturity, as the mother travels with her strange progeny on her back. These hideous creatures are found in Surinam and Brazil, but are not numerous.

### III.—THE SALAMANDERS (*Urodela*),

Resemble the lizards, have the body elongated, four feet of equal length, and a long tail. They differ, however, from the Saurian race in one respect, being more like

the frog in undergoing a gradual metamorphosis, during which they breathe through gills, as well as by having slimy skins.

The *Terrestrial Salamander* (*salamandra terrestris*), plate 18, fig. 8, is nine inches long, one and a half in girth, black, shining, and covered with large yellow spots. It is found everywhere in Europe; its favorite resorts are dark forests, gardens, and by water courses; gait slow, unequal, and unsteady; the head is elevated during its progress.

Some of the urodela (the *Black Newt*) swim; the young, which are brought forth in April, undergo a less complete metamorphosis than the other batrachians, for in their perfect state they still retain the tail. The young salamanders are at this time one inch in length, brownish-yellow, spotted with black, having four feet, and possessing gills. They begin at once to swim, and provide their own food, which consists of water insects; when they are one year old, their spots change to a beautiful yellow. The old salamanders very seldom go into the water, although they can swim. They have been described as having the property of resisting the action of fire; that, if exposed to the influence of burning coals, drops of milky fluid will exude from the skin and extinguish the flames, so that the creature passes through it unharmed. This humor has also been accused of being poisonous, and it has been insisted upon, that, when a number of these urodela are imprisoned together, they devour one another. These tales are all untrue. The skin of the salamander is always moist—some say, only when irritated—but the greater number have no milky exudation. Like others of the urodela family, they feed



on snails, worms, and the larvæ of insects, but never on their own species.

The *Black Salamander* is much smaller and more rare.

The *Triton* or *Aquatic Salamander* (*triton cristatus*) is six inches long, color a dark olive-green, spotted with black above, below bright yellow, also spotted with black, has a skinny crest, extending the whole length of the back, which changes its color. They are rather neat little creatures, which are found in ponds, swimming merrily round, frequently coming to the surface to breathe, and then diving suddenly. They subsist on worms, insects, the spawn of frogs, and young water snakes; and when taken, utter a kind of growl. An acrid humor oozes from their warts, which must not come in contact with the eyes, as it produces serious consequences. In October they crawl to the shore, and hide in holes or hollow trees, where they sleep all winter. The larvæ have gills like fishes, and swim most actively. The eggs are found hanging on water plants, and the development being very slow, the animal does not attain to maturity until the third year. They change their skins every week, and, it is said, swallow the one thrown off. If sprinkled with salt they soon die. If mutilated in any way, Nature at once reproduces the part; if a limb is cut off, it is soon replaced; and even the eye, after being extirpated, grows again perfect as ever in the space of a year. There are different species, which are smaller.

## IV.—FAMILY OF BRANCHIFERA.\*

Salamandrine Amphibia is composed of batrachians that always preserve their branchiæ during life, and breathe through lungs as well as gills. The most remarkable of this race is

The *Proteus* (*proteus anguineus*), more than a foot long, and only as thick as a finger, flesh-colored, and having reddish gills at the back of the head, is found in the subterraneous waters of the caverns of Carniola. Its skin is so thin and transparent that the internal organs are distinctly seen; in the light its color is always violet. If imprisoned in a vessel filled with water it lies stretched out on the bottom, but if the water is not changed, it comes occasionally to the surface. The quality of its food is not ascertained, as it never eats in confinement, although kept many years. It is heard occasionally to sigh, and is supposed, in its native state, to be vivaporous, and to feed on small water snakes and worms

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\* Four genera of this race are known, namely, the *Axolotus*, the *Menobranchus*, the *Proteus*, and the *Siren*.

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## GLOSSARY.

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- ABDOMEN.**—From the Latin *Abdere*, to conceal. The chief viscera contained in the abdomen are the stomach, intestines, liver, etc.
- ABSORPTION.**—From the Latin *absorbere*, to suck up. The function of the absorbent vessels, by virtue of which they take up substances from without or within the body.
- ALIMENT.**—From the Latin *alimentum*, which is formed from *alere*, to nourish. Any substance which, if introduced into the system, is capable of nourishing it, and repairing its losses.
- ALVEOLUS.**—Latin. The hole in which a tooth is placed.
- ANIMAL.**—From the Latin *animalis*. A name given to every animated being provided with digestive organs.
- AORTA.**—From the Greek *aorte*, a vessel. The great artery which arises from the left ventricle of the heart, and conveys the blood to all parts of the body.
- APPARATUS.**—Latin, *ad*, for, and *parare*, to prepare; a collection of instruments or organs for any operation whatever.
- ARTERY.**—From the Greek *arteria*, formed, according to some, from *acr*, air, and *terein*, to preserve; because it was anciently believed that the arteries were filled with air like the windpipe. The vessels which convey blood from the heart to all parts of the body are called arteries.
- AUDITORIUS.**—Latin. Belonging to the sense of hearing.
- AURICLE.**—From the Latin *auricula*, which is the diminutive of *auris*, an ear. The two auricles of the heart derive the name from their resemblance to ears.
- AZOTE.**—From the Greek *a*, privative, and *zōe*, life without life; because azote will neither support animal life nor combustion. A gas which is unfit for respiration. It is one of the component parts of the atmosphere. Also called Nitrogen.
- BILE.**—A yellow, greenish, viscid, bitter, nauseous fluid secreted by the liver to aid in the process of digestion. The gall.
- BOTANY.**—From the Greek *botane*, a plant. The Natural History of plants.
- BRANCHIÆ.**—Latin. It is derived from the Greek *braychos*, the throat. The gills or respiratory organs of fishes.
- BRONCHIÆ.** From the Greek *braychos*, the throat. The two branches of the windpipe which convey air to the lungs.
- CANINE.**—From the Latin *canis*, a dog. The name of certain teeth.
- CAPILLARY.**—From the Latin *capillus*, hair. Hair-like, small. The capillary vessels are the extremely minute terminations of the arteries, and commencing branches of the veins.
- CAPSULES.**—Membranous pouches (dental) in which the teeth are formed.
- CARDIA.**—From the Greek *kardia*, the heart. The left opening of the stomach, where the cesophagus enters it.
- CARTILAGE.**—Gristle. A solid part of the animal body of medium consistence between bone and ligament.
- CAVA.**—Latin, hollow. *Vena cava*, the hollow, or deep-seated vein. A name given to the two great veins of the body which meet at the right auricle of the heart.
- CHOROID.**—From the Greek *chorion*, the skin, and *eidos*, resemblance. The name of several vascular membranes. A thin membrane of a very dark color which lines the sclerotica internally.
- CHYLE.**—From the Greek *chulos*, nutritive juice. A nutritive fluid of a whitish appearance, which is extracted from food by the action of the digestive organs.
- CHYME.**—From the Greek *chumos*, juice. A kind of grayish pulp formed from the food after it has been for some time in the stomach.
- COCKLEA.**—Latin. A snail-shell. The name of one of the three cavities of the ear.
- CONCHA.**—The hollow part of the cartilage of the external ear.
- CONJUNCTIVA.**—Latin. Formed from *con*, with, and *jungere*, to join. The mucous membrane which covers the anterior surface of the ball of the eye, and unites it to the lids.
- CORION.**—The skin.

- CORNEA.**—One of the coats of the eye so called because it has some resemblance to horn. It forms about one-fifth of the anterior part of the eye.
- CRUSTACEA.**—From the Latin *crusta*, a crust. A class of animals whose bodies are inclosed in a covering, like the crab.
- DECIDUOUS.**—From the Latin *cadere*, to fall. That which falls off—not permanent.
- DEGLUTITION.**—From the Latin *deglutire*, to swallow. The act by which substances are passed from the mouth into the stomach, through the pharynx and œsophagus.
- DERMA.**—Greek. The skin.
- DIAPHANOUS.**—From the Greek, *dia*, through, and *phanein*, to shine. Permitting the passage of light.
- DIAPHRAGM.**—From the Greek *diaphragma*, a partition. The fleshy or muscular partition between the cavity of the chest and the cavity of the abdomen.
- DIASTOLE.**—From the Greek *diastello*, I open, I dilate. The dilatation of the heart and arteries when the blood enters their cavities.
- DORSAL.**—Belonging to the back.
- EPIDERMIS.**—From the Greek *epi*, upon, and *derma*, skin. The external covering of the derma. The cuticle or scarf-skin.
- EPIGLOTTIS.**—From the Greek *epi*, upon, and *glottis*, the glottis. A species of cartilaginous valve, situated at the upper part of the larynx, behind the base of the tongue. It closes at the moment of swallowing, and thus assists in preventing the passage of alimentary substances into the air-tubes.
- EXTREMITIES.**—The limbs and arms.
- FIBER.**—An organic filament of a solid consistence, and more or less extensible, which enters into the composition of every animal and vegetable texture.
- FIBROUS.**—Composed of fibers.
- FOLLICLE.**—From the Latin *folliculus*, a bag. A diminutive glandular sac or bag.
- FILAMENT.**—Latin, *filamentum*, which is the diminutive of *filum*, a thread; a very small fiber—a fibril.
- FOSSÆ.**—Nasal. The nostrils.
- GANGLION.**—From the Greek *ganglion*, a knot. Nervous ganglions are enlargements or knots in the course of a nerve.
- GAS.**—Any substance or fluid which is permanently æriform under the ordinary condition of the atmosphere.
- GENUS.**—Race, breed, stock, lineage.
- GENERA.**—Plural of genus.
- GENERIC.**—Belonging or relating to a genus.
- GEOLOGY.**—A description of the structure of the earth.
- GLOBULE.**—Latin *globulus*, a small globe.
- GLOTTIS.**—A small, oblong aperture, situated at the upper part of the larynx.
- LABYRINTH.**—From the Latin *labyrinthus*, a place full of turnings. Anatomists have given this name to the aggregate of parts constituting the external ear.
- LACHRYMAL.**—Relating to the tears. *Puncta lachrymalia*, the tear duct.
- LAMINA.**—A thin piece of metal or bone, a plate.
- LARYNX.**—From the Greek *larynx*, a whistle. The apparatus of voice, situated at the superior and anterior part of the neck, and at the top of the trachea, with which it communicates.
- LIGAMENT.**—From *ligare*, to tie. A name given to fibrous structures which serve to unite bones, and form articulations.
- LUMBAR.**—Relating to the loins.
- LYMPH.**—A name given the fluid contained in the lymphatic vessels and thoracic duct of animals.
- MAMMALIA.**—From *mamma*, a breast. Animals that suckle their young.
- MEATUS.**—Latin. A passage.
- MEDULLA.**—Latin. Marrow.
- MEMBRANE.**—A name given to different thin organs, representing species of supple, more or less elastic webs.
- MITRAL.**—Of the form of a miter or bishop's bonnet. The name of two valves of the heart.
- MOLAR.**—From the Greek *molos*, a grindstone or millstone; or from the Latin *molo*, I grind. That which bruises or grinds. Therefore the molars or jaw teeth are called grinders.
- MOLLUSCA.**—From *mollis*, soft. A class of marine animals without vertebrae, which have blood-vessels, a spinal marrow, and a simple body without articulated limbs.
- MOTOR.**—Muscles. That which moves, or gives the power to move.
- NITROGEN.**—From the Greek *nitron*, niter, and *genn o*, I beget. The name given to azote on account of its being the acidifiable base of nitric acid.
- ŒSOPHAGUS.**—From the Greek *oio*, I carry, and *phago*, I eat. A tube leading from the mouth to the stomach for the transmission of food. The gullet.
- ORBIT.**—From *orbis*, a circle. The circular cavities which lodge the organs of sight are so called.
- OXYGEN.**—A gas which constitutes about one-fifth of our atmosphere, which is necessary to the respiration of animals, and consequently indispensable to animal life. It can not, however, be breathed alone with impunity for any considerable time, but requires to be mixed with about four parts of nitrogen or azote.

- PANCREAS.**—A gland deeply seated in the abdomen, which resembles the salivary glands in its structure, and has been called the abdominal salivary gland. The part of a calf known as the *Sweet-bread* is the pancreas.
- PAPILLA.**—Latin. A name given to small eminences which appear to be formed by the ultimate expansion of the vessels and nerves.
- PERICARDIUM.**—From the Greek *peri*, about, and *kardia*, the heart. It is a membranous sac which envelopes the heart, and the venous and arterial trunks that pass from or into it.
- PHARYNX.**—The swallow; the superior opening of the œsophagus.
- PORTA.**—Latin. A gate. The part of the liver where its vessels enter as by a gate. The *vena porta* is a vascular apparatus which conveys black blood to the liver.
- PREHENSION.**—From the Latin *prehendere*, to lay hold of. The prehension of aliment consists in laying hold of and conveying food into the mouth.
- PROCESS.**—Latin, *procedo*, I go before. An eminence of bone.
- PULMONARY.**—Belonging or relating to the lungs.
- PYLORUS.**—From the Greek *pule*, a gate, and *ouros*, a guardian. The lower or right orifice of the stomach.
- RETINA.**—From the Latin *rete*, a net. The essential organ of vision; on it the images of objects are impressed.
- SALIVA.**—Spittle.
- SAP.**—The nutritious liquid or blood of plants.
- SCLEROTICA.**—From the Greek *sklerōs*, I harden. A hard, resisting, pearly white, opaque membrane, which forms the posterior four-fifths of the external coat or covering of the eye-ball.
- SKELETON.**—From the Greek *skellō*, I dry. The aggregate of the hard parts of the body, or the bones.
- STERNUM.**—From *sternos*, solid. The breast-bone.
- THORAX.**—The chest, or that part of the body destined to lodge and protect the chief organs of respiration and circulation, the lungs and heart.
- TISSUE.**—From the Latin *texere*, to weave. In anatomy the term is used to describe the substances of which the organs of animals in general, and of man particularly, are formed, and which result from the interlacement of fibers. Thus the terms *muscular tissue* and *osseous tissue* mean the structure of which the muscles and bones are composed.
- TRACHEA.**—The canal which conveys the air to the lungs. The windpipe.
- TRICUSPID.**—From the Latin *tres*, three, and *cuspis*, a point, having three points. The three valves situate in the right auricular ventricular opening of the heart are thus named.
- TYMPANUM.**—A drum. The drum of the ear.
- TYMPANI.**—Genitive case of *tympanum*. Of the drum of the ear.
- UNGUIFORM.**—Of the form of a human nail.
- VALVE.**—From the Latin *valvæ*, doors. A small door. Any membrane or doubling of membrane which prevents fluids from flowing back in the vessels and canals of the animal body.
- VEIN.**—The veins are vessels for the conveyance of black blood from all parts of the body to the heart. They are found wherever there are arteries.
- VERTEBRA.**—From the Latin *vertere*, to turn. This name has been given to each of the bones, which by their union form the vertebral or spinal column; vulgarly called the back bone.
- VISCID.**—Glutinous; sticky; tenacious.
- VISCUS.**—Any entrail or internal part, as the heart, liver, lungs, pancreas, etc.
- VISCERA.**—The plural of viscus.
- VITREOUS.**—Resembling glass. Applied to the humor of the eye.
- ZOOLOGY.**—From the Greek *zoon*, an animal, and *logos*, a discourse. That part of Natural History which treats of animals.





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